

Natural Disaster Survey Report

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Southern California Floods

January 4 - 11, 1995



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Western Region
Salt Lake City, Utah

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Preface

The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service, Western Region Headquarters, assembled two Regional Survey Teams following the record heavy rain-flooding, flash flooding, and mudslides that occurred during January 3-11, 1995. The purpose of these surveys was to review the quality of services provided by the NWS prior to and during this record breaking event and to examine ways, if any, that services can be improved. The floods, flash floods, and mudslides in California were a major hydrometeorological event which resulted in loss of life and a large loss of property. When a severe event such as this occurs, it is NWS policy to conduct a review to ensure the best service possible.

This report was filed by the team assigned to review the products and services issued by NWSFO Los Angeles at Oxnard, CA, WSO Santa Maria, CA, and WSO Riverside, CA. The team consisted of Rich Douglas, Deputy Chief of the Meteorological Services Division (team leader) Western Region Headquarters; Paul Flatt, Warning Coordination Meteorologist, WSO Tucson, AZ; Andy Bryant, Service Hydrologist, WSO Tucson, and Gary Barbato, Service Hydrologist, NWSFO Reno, NV. A second survey team was assigned to review NWS products and services for northern and central California; they have prepared a separate survey report. A meteorological analysis was prepared by Glen Sampson, Meteorologist in the Scientific Services Division, Western Region Headquarters which addressed weather conditions which affected all of California. The same analysis is included in the survey reports of both teams.

The southern California team assembled in Oxnard on the evening of January 16, to discuss survey strategy and review the event. On January 17, the team convened its survey at NWSFO Los Angeles at Oxnard. The team split into two groups on January 18 and 19, with one team traveling to Santa Barbara County on the 18th and Riverside County on the 19th. The second group visited with users in Los Angeles County on those two days. The team reconvened at the NWSFO on January 20, and provided an outgoing briefing to Deputy Meteorologist in Charge, Bob Robinson.

The team wishes to express its appreciation to the staffs of NWSFO Los Angeles at Oxnard, WSO Santa Maria, and WSO Riverside for their cooperation and support during the period while the survey team was on site, and for their assistance in preparing and providing necessary information for this survey.

EXECUTIVE SUMMARY

From Tuesday, January 3, 1995, through the early morning hours of Wednesday January 11, 1995, a series of Pacific storms brought unusually heavy rains to Southern California, specifically the counties of San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and portions of Riverside and San Bernardino. The rains resulted in extensive flooding to homes, businesses, agricultural land, and roadways in portions of these counties. In many locations the damage was serious and extensive. For example, in Santa Barbara county there were 543 homes and 68 businesses flooded with an estimated \$114M in property damage. Overall storm damage from the January 3 through 11 flooding throughout ALL of California is estimated to be \$1.337 billion dollars, with eleven fatalities associated with the weather and flooding. Forty-two California counties were declared Disaster Areas, which included the above mentioned counties in Southern California.

There were two major heavy rain/flood periods, (1) January 4, and (2) the late evening of January 9 through January 10. However, intermittent rain from January 3 - 11 exacerbated flood problems by saturating soils on foothills and in mountain areas. The heaviest rains in many areas were classified as between 50 and 100 year events by County Flood Control Agencies. One specific site in Santa Barbara County was declared to have been a 500 year event. Rainfall amounts from January 3 through midday January 11 included Santa Barbara 16.69", Santa Maria 6.84", Ventura 11.43", Malibu 12.59", the Los Angeles Civic Center 7.06", and Laguna 8.74". The rains were associated with the same storm system which caused major flooding in portions of northern California, especially on the late evening of January 9 through January 10, which are described in a separate storm report.

The warning and forecast services from NWSFO Los Angeles, WSO Riverside, and WSO Santa Maria were judged to have been excellent. In every interview with emergency services, flood control agencies, and the media, officials stated that the warning products and services provided were excellent and much improved from the last major flood episode which occurred in February, 1992. Factors contributing to this improvement were (1) the Vandenberg and Ojai WSR-88D radars, (2) an improved working relationship between the NWSFO and the media and emergency service agencies as a result of the outreach activities of the Warning Coordination Meteorologist (WCM), the Service Hydrologist, the Warning Preparedness Meteorologist, and the current and previous Area Managers (Todd Morris and Jerry McDuffie), (3) adequate staffing levels at the NWSFO, (4) a proactive management philosophy whereby extra staff are added to the NWSFO operations during major events, specially dedicated operators for both WSR-88D radars and an event coordinator, and (5) an extensive ALERT network which provided real time rainfall data. Many of the watches, warnings, and advisories

were issued with three to twelve hour lead times. Special weather statements provided even more advanced notice of the heavy rain events and were accurate with regard to storm rainfall totals. One hundred and sixty-three products were issued by the Los Angeles NWSFO during the event. The following are examples which illustrate the types of long lead times provided by the NWS prior to the onset of the major rain episodes.

- Wednesday, January 4 Heavy Rain Event: A special weather statement issued at 9:00 pm on Tuesday, January 3, which stated that "heavy rain is in the forecast for Wednesday and Wednesday night and a Flash Flood Watch may be issued later". A Flash Flood Watch was issued at 3:25 am Wednesday, January 4, for that afternoon and night which stated that rainfall could total from three to five inches. This watch was issued six hours in advance of the onset of heavy rain in Santa Barbara and Ventura counties, which spread east and south later in the day. The advance notice provided by these and other products motivated the Corps of Engineers to close the road into the Sepulveda Detention Basin before flooding became a problem and trapped motorists. This is in direct contrast to the February 1992 event when a number of automobiles were trapped by flood waters.

- Monday evening - January 9 through Tuesday - January 10 Heavy Rain Event: A special weather statement issued 6:00 am Sunday, January 9 stated that a "much stronger storm with more significant rain will move into the Southland Monday Night and Tuesday". Flash Flood Watches and Urban and Small Stream Flood Advisories for much of the area were issued at 9:55 am Monday, January 9, for the remainder of the day through January 10. The first Flash Flood Warnings were issued at 11:30 pm for West Ventura County and at 12:45 am on the 10th for Santa Barbara County. These warnings were based upon short term QPF estimates from the Ojai WSR-88D radar which were deemed high enough to result in serious flood problems. The 11:30 pm Flash Flood Warning stated the "Sulphur Mountain Doppler radar showed a large area of rain moving across Santa Barbara County, moving eastward into Ventura County. The Ventura River at Meiners Oaks has reached a stage high enough for alerts to be issued, but with radar indicating a couple inches of rain by dawn, a flash flood warning is deemed necessary".

PART I: FINDINGS AND RECOMMENDATIONS The Survey Team believes that the following findings and recommendations can serve as a means to highlight the strength of the NWS forecast and warning system in southern California and identify areas where improvements are still possible.

1 THE PERFORMANCE OF THE VANDENBERG AND OJAI WSR-88Ds WAS EXCELLENT AND ALLOWED THE NWS TO ISSUE TIMELY AND ACCURATE WARNING PRODUCTS :

*NO Wxy
it was 1000%
too low
on Rainfall
takes consistently*

The WSR-88D was key in issuing warnings and statements. The biggest impact was in four areas: (1) tracking areas of convection associated with heavy rain, (2) monitoring the potential for high wind events. The WSR-88D showed correctly that most events in the Los Angeles basin were below 50 knots and warnings were not issued. (3) The NWSFO used the WSR-88D to monitor highly sensitive areas, such as the burn areas, and (4) the WSR-88D was used by the Palmdale CWSU to reroute air traffic.

The tracking of convective bands with the WSR-88Ds was excellent. Figures 1 and 2 illustrate these points well. Figure 1 shows a convective band (red area) moving through the western portion of the Los Angeles basin. Figure 2 shows an extensive band moving from the ocean towards Santa Barbara County. Doppler radar observations provided critical information for forecasters to issue statements alerting the public to these band of thundershowers as they approached. Due to the fact that these bands originated over the ocean, radar was one of the few data sources available for detecting these phenomena.

Numerous wind events occurred during the January storms. Figures 3 and 4 illustrate the data used in issuing wind warnings in Santa Barbara county. Figure 3 is a 0.5 degree elevation scan of the velocity data. Greens are inbound winds and reds are outbound; thus, a strong southwesterly wind resides at the surface, and the wind veers to west-southwest aloft. Figure 4 provides the vertical wind structure for 35 minutes later than Figure 3. Winds are 50 knots or greater at all levels.

Other specific findings include:

- o Forecasters used composite reflectivity combined with ALERT gage data to estimate the duration and amount of the precipitation events. The NWSFO has an excellent ALERT system with good coverage in many portions of their county warning area. For these events, the NWSFO found that 35 dbz reflectivities correlated well to heavier precipitation events. The NWSFO forecasters were able to

01/27/95 00:30
 CMP REF 37 CR
 124 NM 54 NM RES
 01/04/95 23:32
 RDA:KVTX 34/24/43N
 2887 FT 119/10/44W

MODE A / 21
 CNTR 149DEG 47NM
 MAX= 53 DBZ

NO DBZ
 5
 10
 15
 20
 25
 30
 35
 40
 45
 50
 55
 60
 65
 70
 75

MAG=4X FL= 1 COM=1
 OUL:ST M AT
 OUL U/A:HI TV

A/R <HOME>
 015 V 0015 R
 PROD RCUD: R RPS
 KVTX 0025 .54 1.5
 27/0019 ARCHIVE
 UNIT 1 READ DONE
 HARD COPY
 HARD COPY REQUEST
 ACCEPTED

STM ID	AZ	RAN	TUS	MESO	HAIL	DBZM	HGT	ULOW	STM	TOP	FCST	MUMT	MM	UOL
46	135	51	NO	NO	NEG	51	4.4	51	8.74	286	38	38	9230	
47	170	32	NO	NO	NEG	39	5.5	9	5.46	286	38	38	59	

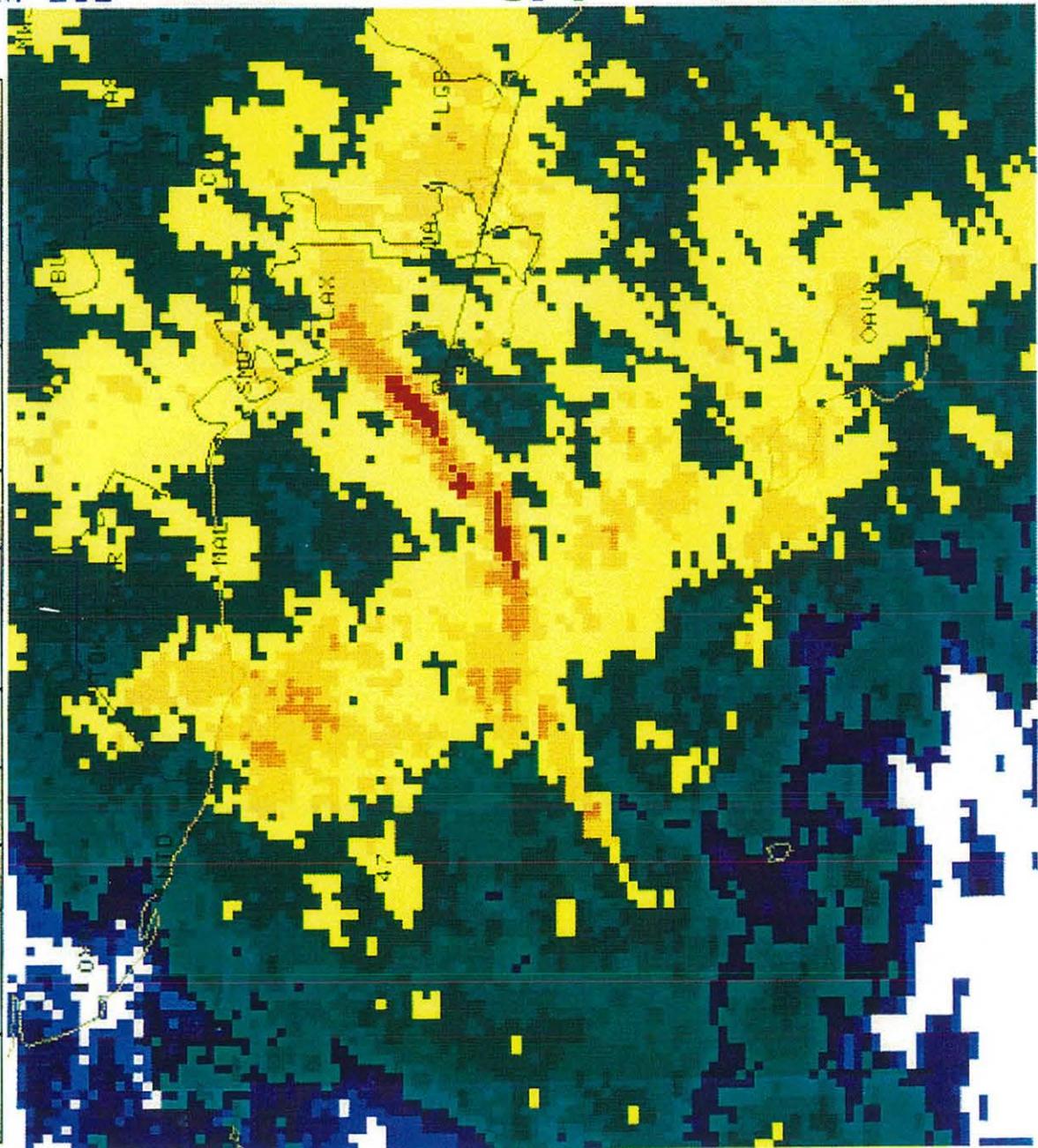


Figure 1 - Convective band near Santa Monica Bay. This composite reflectivity product was observed on January 4, 1995 at 2332Z. Red colors represent reflectivities of 50 dBZ or higher.

STM ID	AZ	RAN	TUS	MESO	HAIL	OB2M	HGT	VLOW	STM TOP	FCST	MUMT	MN	VOL
P	279	58	NO	NO	NEG	57	5.1	106	18.39	252	28	16590	
19	339	31	NO	NO	NEG	57	1.9	74	9.09	216	26	304	
21	359	39	NO	NO	NEG	40	7.2	67	7.17	235	27	115	

01/27/95 17:23
 CMP REF 37 CR
 124 NM 54 NM RES
 01/07/95 07:01
 RDA:KUEX 34/50/16N
 1221 FT 120/23/45W

MODE A / 11
 CNTR 0DEG 0NM
 MAX= 65 DBZ



MAG=2X FL= 1 COM=1
 OUL:ST AT
 OUL U/A:HI M TV

A/R (RDA)
 015 CR 1705 R
 PROD RCUD: U RPS
 KUTX 1714 .54 2.5
 27/1716 #TIME OUT*
 CAN'T EDIT RCM
 HARDCOPY
 HARDCOPY REQUEST
 ACCEPTED

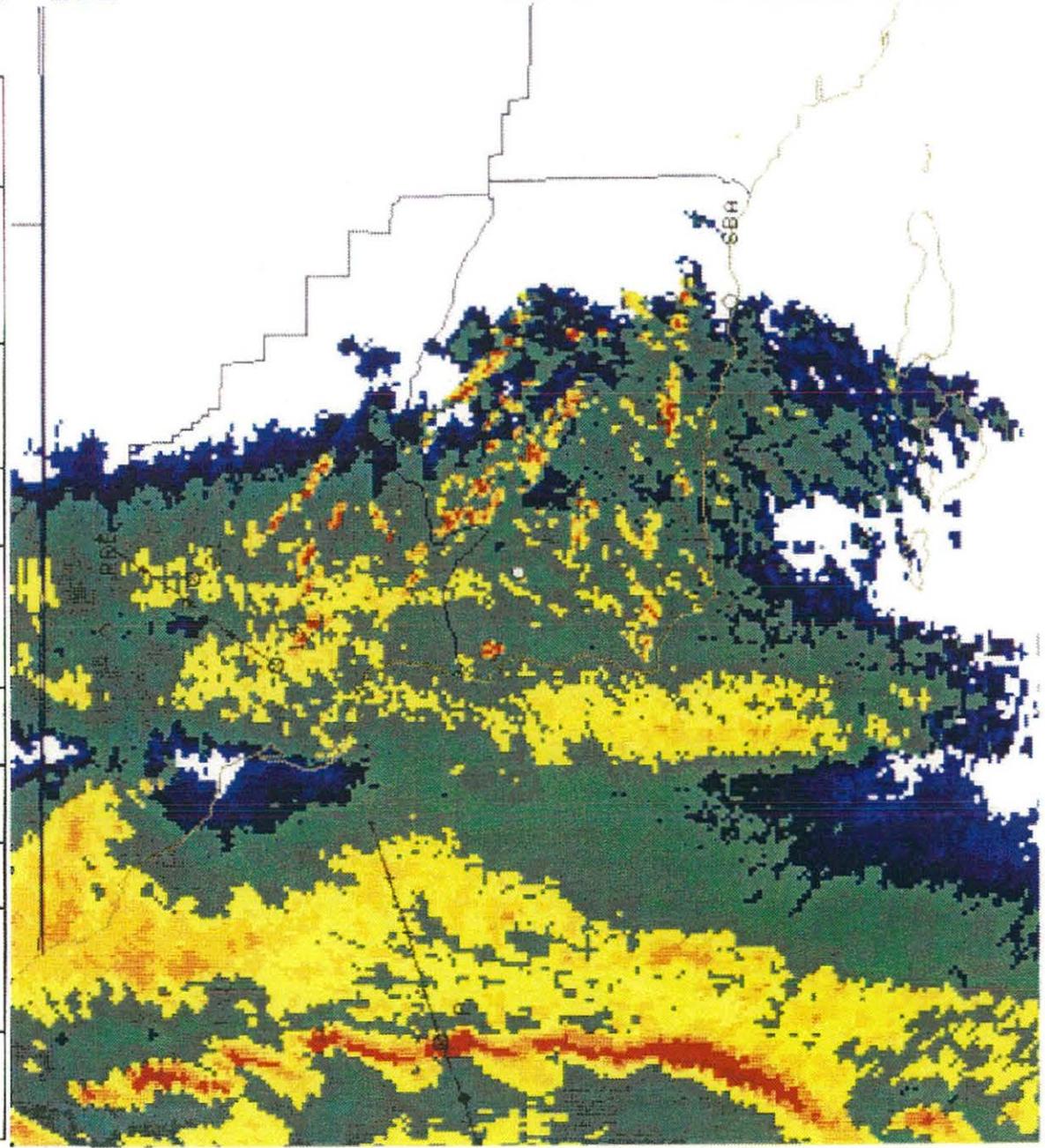


Figure 2 - Extensive convective band on the east end of Santa Barbara Channel. This composite reflectivity product was observed on January 7, 1995 at 0701Z. Red colors represent reflectivities higher than 50 dBZ. A maximum reflectivity of 65 dBZ exists in this band.

01/26/95 23:50
 BASE VEL 27 U
 124 NM 54 NM RES
 01/04/95 17:05
 RDA: KUBX 34/50/16N
 1321 FT 120/23/45W
 ELEU= 0.5 DEG
 MODE A / 21
 CNTR 225DEG 1NM
 MAX=-123 KT 122 KT

ND KT
 -64
 -50
 -36
 -26
 -20
 -10
 -1
 0
 10
 20
 26
 36
 50
 64
 RF

MAG=2X FL= 1 COM=1

A/R (HOME) 75 DEG
 1362FT 16 NM
 015 U 2333 R
 PROD RCUD: STP RPS
 KUBX 2343
 PAT= 32
 26/2340 VOL COV
 HARDCOPY

HARDCOPY REQUEST
 ACCEPTED

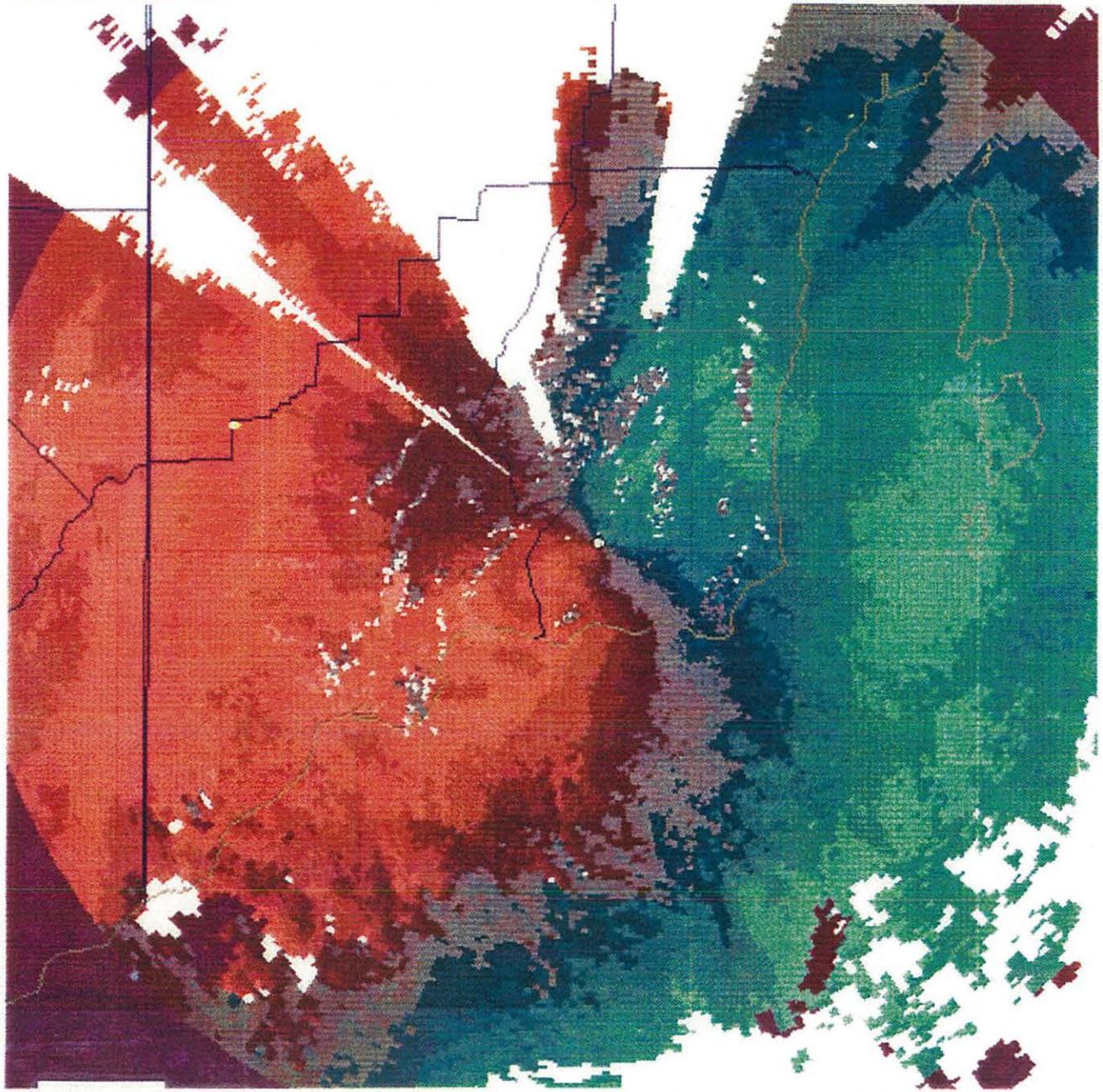


Figure 3 - Base velocity field at 0.5 degrees from the Vandenberg WSR-88D on January 4, 1995 at 1705Z. Green colors represent inbound winds and reds represent outbounds; thus, a strong southeasterly wind resides at the surface.

01/26/95 23:59
 VAD WIND PROFILE
 48 UMP
 01/04/95 17:40
 RDA: KUBX 34/50/16N
 1321 FT 120/23/45W
 MODE A / 21

MAX=253 DEG 76 KT
 ALT: 30000 FT



FL= 1 COM=1

A/R (HOME)
 015 STP 2343 R
 PROD RCVD: U RPS
 KUBX 2343 .54 2.5
 26/2340 VOL COV
 PAT= 32
 HARDCOPY
 HARDCOPY REQUEST
 ACCEPTED

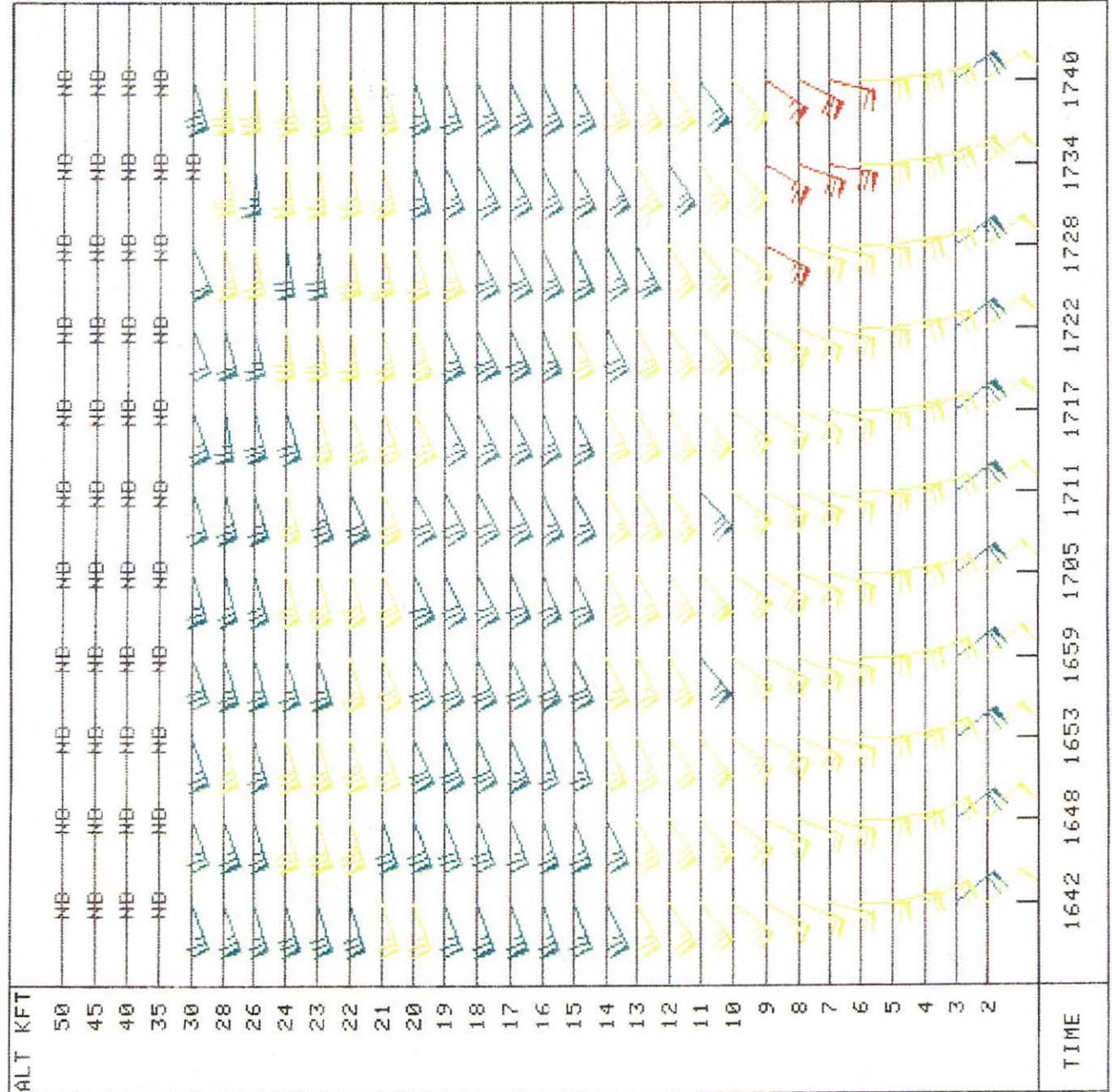


Figure 4 - Velocity azimuth display wind profile generated by the Vandenburg radar on January 4, 1995 at 1740Z. Strong winds exist at all levels with 50 knots observed at the surface.

produce very timely precipitation forecasts with this approach.

- o The radar precipitation estimates from the WSR-88D were consistently underestimated and hence not used much by forecasters. The WSR-88D twenty-four precipitation estimates for valley locations were typically two inches while three inches were reported by ALERT gauges. In mountain areas, the radar precipitation estimates were in the three to four inch range, while actual amounts ranged from six to eight inches. The Ojai WSR-88D is located at 2,725' MSL and the Vandenberg system is located at 1,223' MSL.
- o The NWSFO felt confident using the velocity data to estimate strong surface winds associated with fronts and convection. There were cases where the radar detected winds of less than 50 knots and warnings were correctly not issued, when otherwise they probably would have been issued.

It is noteworthy to compare the storms in Southern California from January 3 through 11, 1995, to those that flooded southern California in February 1992, and the improvement of the capabilities of the WSR-88D over the WSR-74C. Both events took place during the height of the rainy season, during the months of January and February and caused widespread flooding from Santa Maria southward to Orange county. In 1992, warnings and advisories were at best issued as the events were occurring. The WSR-74C radar was located atop the federal building. This radar, when not attenuated, provided basic reflectivity data out to 125 NM. In addition, echo tops were NOT reported. Using the commissioned WSR-88D Doppler radars, the Los Angeles NWSFO provided high quality, timely, weather warnings and advisories. Many of these warnings and advisories were issued with three to six hours of lead time. Other direct comparisons of the two weather radar systems include the following:

- o The 88D provided very detailed reflectivity data of where the heaviest rain was falling from as far away as 250 NM. The 74C failed to detect much of the rain in 1992 because of attenuation and the fact that there was terrain blockage and a very large ground clutter problem in the city of Los Angeles.
- o The 88D, using wind data, allowed the meteorologist to identify significant wind signatures within a given storm. This information was used to issue wind advisories, issue marine advisories with the mention of possible waterspouts, as well as alert both the Air Route Traffic Control Center and LAX of approaching wind shear.

The 74C did not have this capability.

- o The 88D provided numerous automatically generated alerts for individual storm cells based upon preset severe weather thresholds. These included alerts for wind, for intensity, and for rainfall rates. The 74C did not have this capability.
- o The 88D provided qualitative 1 hour and storm total precipitation maps. These in turn were used to focus on the most flood threatened areas. The 74C did not have this capability.
- o The 88D provided very colorful graphics which were also printable. Print copies were then made available to emergency managers either in face to face briefings or by FAX to emergency operations centers as requested. Furthermore, several news media used the 88D graphics as a backdrop in their evening broadcasts as well as "teasers" to the upcoming news programs. The 74C did not have color and the graphics were not printable.
- o Using the 88D, the entire event was archived. This will allow the NWSFO staff as well as others to later go back and study from this historic event. The 74C did not have this capability.
- o During the eight day period in 1995, there were 270 briefings or interviews with various media, all of which utilized the 88D data. During the same period, using the same data, there were 133 briefings to emergency officials.

2. THE ADEQUATE LEVEL OF STAFFING AT NWSFO LOS ANGELES AND THE PROACTIVE USE OF PERSONNEL RESOURCES WERE CRITICAL IN PROVIDING A TIMELY WARNING AND FORECAST SERVICE DURING THIS PROLONGED AND MULTI-FACETED PERIOD OF STORMINESS.



In order to utilize the Ojai and VBG WSR-88Ds, provide critical media briefings, work with emergency service agencies, and provide warnings and forecasts for the large number of different types of events in the area (winter storms in the mountains, flooding in lowlands, etc), it was necessary to staff EIGHT operational forecasters per shift on two occasions during the "heights of the storm". These operational positions were as follows:

1. Public forecaster
2. Aviation forecaster
3. An Event Coordinator (described below)
4. A forecaster to prepare warnings and statements
5. A dedicated VBG WSR-88D radar operator

6. A dedicated Ojai WSR-88D radar operator
7. A service hydrologist or "stand-in"
8. A forecaster to brief the media (not staffed late at night). Note: From January 7 through 11, NWSFO Los Angeles provided 270 briefings to the media. Two of the briefings were for the CBS Evening News (Rather/Chung) and one for ABC World News Tonight (Jennings).

The NWSFO had previously enacted a policy entitled "Special Operations" whereby additional forecasters are added to the operations, depending on extent and severity of impending weather. An Event Coordinator (EC) is chosen who monitors and continually reassess the need for warnings and periodic statements. The EC integrates the actions of the forecast staff to ensure a well-coordinated forecast and warnings service. Fortunately NWSFO Los Angeles was fully staffed during the event and able, through the use of extensive overtime, to ensure adequate levels of staff were on-hand to provide a first-class performance.

It is noteworthy to mention that after the major flood event of 1992, a service hydrologist and warning preparedness meteorologist were added to the staff of NWSFO Los Angeles. These positions were key in strengthening the working relationships between county emergency services/flood control agencies and the NWS since 1992. As a result, emergency service users responded in a more timely manner in 1995 to NWS warnings, and shared important flood and rainfall information with the NWS which greatly assisted the issuance of timely NWS products.

3. THERE IS NO SINGLE SYSTEM BY WHICH THE NWS DISSEMINATES ALL ALPHANUMERIC WARNING AND FORECAST PRODUCTS TO EMERGENCY SERVICE AGENCIES AND THE PUBLIC, SINCE THERE ARE ONLY TWO NWS SUBSCRIBERS IN THE LOS ANGELES BASIN.

The survey team discovered that NWS warnings and forecasts are received via a number of different dissemination means. During the flooding, emergency service and flood agencies were receiving NWS products at different times and not all agencies were receiving all NWS products. This added unnecessary time to the warning process and resulted in some confusion among the users. In addition, not all dissemination systems have alarm features which call attention to the user that a critical product has been issued. Lastly only the ALERT system disseminated warnings in text format in real time (NWS has only two subscribers in the Los Angeles basin).

In southern California, the following systems are used to disseminate NWS products. These will be described in a later section in this report.

1. ALERT:
2. NWSFO COMPUTER BULLETIN BOARD
4. FAMILY OF SERVICES
5. CALIFORNIA LAW ENFORCEMENT TELECOMMUNICATIONS SYSTEM (CLETS)
6. EMERGENCY DIGITAL INFORMATION SYSTEM (EDIS)
7. NWR
8. NWS
9. TELEPHONE CALLS FROM THE NWSFO
10. NAWAS
11. EMERGENCY BROADCAST SYSTEM (EBS)
12. PERSONNEL BRIEFINGS TO MEDIA

RECOMMENDATION: To ensure emergency service agencies receive all NWS warnings and products in real time, the NWS may wish to install a system known as WXCOPY on the NWR transmitters in Los Angeles and Santa Barbara Counties. WXCOPY transmits weather forecasts in a digital format in short bursts over NWR. The emergency management and flood control agencies the survey team met with indicated their support of this system and stated they would spend the \$300 required for purchase of a WXCOPY receiver. WXCOPY can display warnings and forecasts on PCs, or print them on a PC printer. In this manner, all users would be receiving the same NWS product directly at the same time, in printed form.

EBS: To activate the EBS system, a telephone call is made to the CPCS - 1 station. However, many of the warnings issued by NWSFO contained headlines of BULLETIN - IMMEDIATE BROADCAST REQUESTED, rather than BULLETIN - EBS ACTIVATION REQUESTED. This caused some confusion and delay in broadcast of warnings.

RECOMMENDATION: The NWSFO should ensure that at a minimum, flash flood warnings and tornado warnings contain the statement EBS ACTIVATION REQUESTED in the product headline.

4. THE DENSE NETWORK OF ALERT GAUGES IN SOUTHERN CALIFORNIA WAS INVALUABLE IN GATHERING REAL TIME PRECIPITATION DATA, ESPECIALLY SINCE THE WSR-88D CONSISTENTLY UNDERESTIMATED TOTALS ON ITS PRECIPITATION PRODUCTS.

NWSFO Los Angeles has two ALERT PCs which do not run as backup to each other. One is used to collect and view hydromet data. The second computer is used to transfer ALERT products to and from AFOS, to county Flood Control Districts, and to set up aviation and public products for AFOS. The NWSFO receives data via two frequencies, 171.05 mhz (from Sisar Peak in Ventura Co. and La Cumbre Peak in Santa Barbara Co.) and 169.475 mhz (from Saddle Peak in the Santa Monica Mountains to the east). Thus, all data to the north comes in on 171.05 and from the south on 169.475. However, during winter storms, a significant amount of data is lost due to "data collision"

problems because there are so many sensors transmitting at the same time. This is a well-known and fairly well-documented problem which is inherent to receiving "packets" of data via radio, such as ALERT uses. The percentage of data lost due to this problem was not determined for this event. (Very little data from the event still existed after the event due to the second problem, discussed below.) Simply, there is just so much data being transmitted during a major storm (more frequent transmissions of wind, stage and precipitation data), that a significant amount of data is lost due to "collision" problems, because sensors frequently transmit at the exact same time.

RECOMMENDATION: Because this problem is so technical in nature it should be looked into and an acceptable solution found, if possible, by California Nevada RFC (CNRFC) staff and/or by the California ALERT User's Group technical review committee.

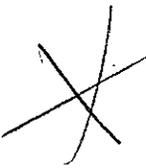
A second problem was noted that appears to have been caused by database corruption and may be related to a software bug or a hardware problem. It was unknown (at least by the NWSFO and CNRFC staff), until this event. The problem resulted in large blocks of all data during certain loosely defined time periods being wiped out of the database sometime after having been received. It is not known exactly when the data was lost, but it is known that the data was received and stored into the database during the event, as the data was used in warning and statement issuances. All types of data were affected (i.e. both telephone-telemetered data as well as radio). On Friday, January 20, the survey team did a little research and roughly determined the time periods which were "wiped out". There were two distinct periods, with just a half hour "data window" between the two (for some sensors which didn't happen to report during this "window", there was just one large gap). The periods included from some time the morning of January 9 (the beginning time varied greatly) to about 0930 PST on January 10, and also from about 1000 PST on January 10 to some time late that afternoon (the ending time also varied). (The "window" of data was only between 0930 and 1000 on January 10)
NOTE: This problem surfaced again the week after the survey team visited the NWSFO, when all data from another storm was lost after the storm. As far as could be determined, no other ALERT user in the Los Angeles area lost data in this way during or after the storm.

RECOMMENDATION: It should be determined if other ALERT Users have experienced this problem, and, if so, the cause has been discovered. If this problem has not been encountered before, it needs to be researched by CNRFC staff if it involves HYDROMET software. If it is from some other cause, it should be researched by the California ALERT User's Group technical

review committee. (It could be a problem with the LOX HYDROMET PC, or added-on software, but as there was no backup computer, this is unknown).

RECOMMENDATION: In order to avoid this problem in the future, WSFO LOX should run HYDROMET on two PCs separately, so that they have a backup. In addition, the ALERT program must be supported by a pool of QNX programmers at the NWSFO. Since ALERT performs such a major data collection, analysis, and dissemination function, the NWSFO must be staffed with persons who have QNX expertise.

5. QUANTITATIVE PRECIPITATION FORECASTS (QPF) ARE THE MOST USED PRODUCT BY FLOOD CONTROL AGENCIES AND MANY EMERGENCY MANAGERS.



QPFs are extremely important to flood control agencies and emergency managers, not only during floods but also during minor storms since flood control agencies must make measurements of non-point source pollutants in small flows for the national NPDES program. Users we surveyed believed the NWSFO QPFs were good for coastal locations, but tended to be too light in the mountains, where orographics are a major precipitation inducer.

Users underscored how important the three to five day forecasts are for planning purposes. Most would like additional longer-range QPFs (the NWSFO forecasts QPF only out to 24 hours) as well as "QPF type information" in the QPF synopsis. The Los Angeles County Public Works (LACPW) stated that with a longer lead time they can generate power with reservoir water and put some into spreading grounds. If they do not have the time they may have to spill water into the flood control channels, which means they lose power revenue and waste water to the ocean. Also, LACEOC patrols flood control channels during high runoff and provides "swift water rescues" in the event someone gets swept into one of them. If the EOC knows a major storm is on the way, they can staff up this operation ahead of time.

Emergency managers noted with appreciation the QPF updates which were provided by the NWSFO during the storm. In addition to using NWS QPFs, several flood control districts contract with private meteorological firms for QPFs, to use as a comparison with NWS products. Many private vendors provide QPFs out to 72 hours, as compared with the NWS which only forecasts QPF to 24 hours; the quality of these 72 hour QPF forecasts is not known at this time.

RECOMMENDATION: The NWSFO should consider expanding its QPF product to include longer range forecasts out to five days. In addition the first six hours should be divided into three hourly intervals. While this may be "stretching" the state of

the art, users believed the NWS could provide more useful QPF forecast information.

The survey team believed that QPFs could be improved in the six to twenty-four hour time frame if forecasters performed a hand-analysis of the ocean in the Southeast Pacific (as is done for other areas by NWSFOS Monterey and Seattle). While such a hand-analysis is not a cure-all it would be one more tool to catch developing storms long before they reach the coast and before numerical models have a chance to get a good analysis over the data-rich land.

RECOMMENDATION: A printer plotter should be provided to the NWSFO to automate the process of plotting observations over the Pacific.

6. THE MULTI-AGENCY OPERATIONS COORDINATION CENTER (OCC) AT RIVERSIDE, CA, PLAYS AN IMPORTANT ROLE IN ALLOCATING FIRE DEPARTMENT RESOURCES DURING MAJOR DISASTER EVENTS.

The OCC is the focal point for resource ordering for Federal, state, and local fire department fire resources to assist emergency managers in dealing with disaster events. During the flood events of January, 1995, the OCC coordinated with the State OES (and others) to allocate resources from local fire departments for assistance in dealing with floods. The OCC receives NWS forecasts from WSO Riverside, CA, in the form of routine and spot forecasts. Although WSO Riverside does an outstanding job in providing support to the OCC, the WSO does not have direct access to WSR-88D data. Furthermore, the OCC must receive the same flood warnings and forecasts, at the same time as the warnings are received by the various State and county emergency service and flood districts.

RECOMMENDATION: The OCC should receive all flash flood warnings, watches and statements directly from NWSFO Los Angeles, in addition to the forecasts provided by WSO Riverside. This could be accomplished easily by WXCOPY, as described above.

RECOMMENDATION: WSO Riverside should receive WSR-88D in real time, as possible. Western Region Headquarters recently distributed software which displays data from the WSR-88D Radar Coded Message onto a PC. This software should be run on a dedicated PC at Riverside for use in their forecast operations.

7. MISCELLANEOUS NWSFO OPERATIONS.

Several items related to storm- operations at NWSFO Los Angeles which we were made aware of are as follows:

- o Because there is no cable TV at the LOX office, the staff can only monitor local TV stations. They are unable to watch most of the major Los Angeles TV station "storm watch" segments during a storm to keep abreast of its severity. The media in southern California has an incredible amount of resources available to gather news, and these resources are in full force to find problem areas during a storm. They don't mind coordinating and passing along information to the NWS, but generally many questions could be answered if the storm stories were being followed on television.

RECOMMENDATION: The NWSFO should subscribe to cable TV to take advantage of the wealth of information available from this

- o There didn't seem to be enough PCs available for use by staff during an event of the magnitude which occurred. People had to "wait in line" to write statements during the height of the storm.

RECOMMENDATION: The NWSFO should be provided with an addition PC workstation. This PC could also drive the printer plotter discussed above.

The "Hydrology Warning Program" portion of the SDM was excellent. It contains hydro product decision trees, taken out of WSOM Chapter E-20 and ROML W-5-93 with E-20. The manual also explains how each hydrologic product is used operationally, and an example of each product. All basins in the NWSFO Hydrologic Service Area (HSA) are described, as well as some of the problem areas.

Service Hydrologist Diana Van Cor had issued a Winter Flash Flood Drill in December, so staff had a good review of hydro operations, and issued practice products. The staff had also completed an in-depth flash flood drill during the summer. Diana had given a seminar on use of the office ALERT recently, and also had developed an ALERT "Quick Reference Guide" for the NWSFO, which explains what ALERT does, reboot procedures, menu items, and troubleshooting procedures, etc. As a result of all this, the NWSFO staff seemed to have a good understanding of hydro-operations.

The California-Nevada (CNRFC) does not issue flash flood guidance for southern California, nor are there any mainstem river forecast points, as all rivers in the HSA are flashy and highly controlled. However, there are some twenty points on small streams and in the headwaters of rivers in the HSA which the CNRFC has modelled, using the Sacramento Model. The model output for these points is updated every 12 minutes in the NWSFO ALERT so that 1) crests using various amounts of QPF or

precipitation which has already fallen can be determined or 2) QPF to reach critical stages/flows can be determined. So, generalized "flash flood" or "headwater" guidance values can be obtained using this model output. Mudflow/debris flow warning criteria (precipitation intensities) for the recent burn areas are provided by the California OES. The NWSFO staff had done a lot of work to determine critical stages and flows for most of these points. Therefore, staff can determine how much precipitation is needed for the points to reach critical stages with just a few keystrokes. These procedures were covered in the drill Diana gave last summer. The fact that many of these models are in need of calibration needs to be kept in mind, however. They should be used strictly as guidance, unless the Counties sanction them as being accurate.

PART II: SURVEY OF USERS The survey team met with the following emergency managers, flood control districts, and media outlets. Highlights from these meetings are as follows:

VENTURA COUNTY: Agencies visited: Ventura County Flood Control District (VCFCD) and Ventura County Office of Emergency Services (VCOES).

- o The NWSFO LOX has done a much better job forecasting, warning and providing quantitative precipitation forecasts (QPFs) since the 88D radar went in. They thought the NWS did an excellent job during the flood events. Information in NWS warnings and advisories were judged to be very useful, and the QPFs were of high quality, though not issued often enough nor far enough into the future.
- o VCFCD receives all forecasts, statements, warnings, QPF, etc. via ALERT with no problems. When an ALERT gage reaches a critical level, or the NWS issues a warning the VCFCD ALERT computer alarms until someone clears the alarm. If no one is there to clear the alarm (other than normal working hours), the computer then dials a predetermined list of staff members at home until someone acknowledges the alarm, which is relayed via voice synthesizer.
- o VCOES does not receive the zone 15 forecast (Santa Barbara/Ventura Co. Coastal Zone), nor did they receive the local forecasts and sometimes did not receive warnings, advisories, etc. They rely on the VCFCD for the NWS products. Area Manager Todd Morris will follow-up to solve these problems.
- o Ventura County Law Enforcement Agencies and OES are reactive to weather-related problems, not proactive. It typically takes three hours to staff their EOC, and then another two hours to become operational. Hence they need at least that much lead time in a warning situation in order to deploy units to trouble areas ahead of time. The Ventura Co. Sheriff receives weather data via CLETS and EDIS only.
- o NOAA Weather Radio does not reach the flood-prone Santa Paula, Fillmore or Ojai Valley areas. These are ideal sites for NWR expansion.
- o Both agencies agreed that the NWS and media need to do more to ensure the public knows the correct interpretation of the various NWS products (watches, warnings, advisories). The NWS needs to continue to work

with the counties and media to ensure the definitions are understood. Definitions of the various action levels should be included on the NWS products.

- o Although coordination was much improved from past years, the NWS should, if at all possible, coordinate with someone from VCFCO or OES before a warning is issued to determine if the warning is warranted, to receive more information, and provide the County the maximum amount of lead time. The NWS already always contacts the counties after a warning is issued.
- o In addition to using NWS QPFs, VCFCO contracts with a private vendor for QPF as a comparison with NWS forecasts. The private vendor provides QPFs out to 72 hours but the NWS provides them only out to 24 hours, so there is no comparison between 24 and 72 hours. VCFCO would like the NWS to do some kind of QPF out to 72 hours. VCFCO noted that QPF from the private vendor are always extremely high.

LOS ANGELES COUNTY: Agency visited: Los Angeles County Department of Public Works (LACPW) and the Los Angeles District of the Corps of Engineers (LACOE).

- o When river runoff begins, all spreading grounds in the L.A. basin are activated, so as much water as possible is put into the ground, and not wasted by running it off into the sea. (Most of the time, the groundwater basins are not saturated.) When river runoff becomes heavier, reservoir operations become more important. LACPW reservoirs are mostly multi-purpose, some being used for recreation, electricity and water supply as well as flood control.
- o Most of the smaller streams in the Los Angeles Basin are concrete and usually controlled by flood control reservoirs (most flood-control reservoirs in L.A. Basin are COE reservoirs, those in the mountains are multi-purpose, and mostly LACPW reservoirs). The main purpose of the flood control reservoirs is to drain the area as quickly as possible, without causing flooding. Although the flood control channels in the urban area usually do not flood, urban flooding (storm drain backups) is a problem until storm water can get into a flood control channel, because most of the urban area is relatively flat.
- o There is a very large "war room" at LACPW, in which up to 70 or 80 people from various county and other local agencies, as well as media representatives may work during a flood event. This room is a communications hub,

and communications can continue via radio if there are telephone outages. There is a USGS 1:24,000 scale topographic map of the entire county (in 2 sections) on the wall where documentation of all current conditions and problems can be kept up to date. There are also two very large screen TV monitors (about 10 ft.) where ALERT data, NEXRAD data or TV newscasts can be shown.

- o Getting accurate weather forecasts and QPFs as far ahead of events as possible is extremely important to all LACPW and OES operations. They like Ventura Co. appreciated the QPF updates provided during the storm.
- o Like all other flood control districts in the area, LACPW receives all NWS products automatically via ALERT. LACPW works closely with WSFO LOX to keep communications going well. LACPW flood operations extracts all NWS forecasts, etc. for the LA County area and issues it in "hard copy" form to 12 users within Public Works (including OES), and also faxes the product to about 25 Los Angeles County users outside Public Works. Though these products are heavily depended upon and widely used, this process is time consuming, expensive, and many times the forecasts are out of date by the time the users receive it. See recommendation for WxCopy.
- o We were informed that LCCPW were well prepared for flooding before this event as they had recently had a meeting to discuss how their operations and response would change during a major flood episode.
- o In addition to NWS data, LACPW also has been contracting with a private vendor to obtain weather information. From their vendor they are able to obtain updates from NEXRAD every volume scan, and usually display the radar data on the large-screen TV in the "war room". They use base reflectivity almost exclusively, as the precipitation products are of little value due to the underestimation problem. Though they have been receiving radar data from the NWS for many years, images from the 88D are far superior and provide much more detail than did images from the old 74C radar. They informed the survey team that they would like to receive more training on interpretation of NEXRAD data. As most of the personnel at LACPW are engineers and hydrologists, no one there has had any formal training in radar interpretation, so they are just guessing at what they're looking at. However, qualitatively, the data was a great help in detecting problem areas.
- o ALERT worked very well during the event. There was some data missed (due to data "collision"), which they

expected. They didn't have any large data losses like NWSFO Los Angeles experienced.

Los Angeles District of the Corps of Engineers (LACOE).

- o The January 4th event was mainly a problem in the southern part of the Los Angeles Basin, and put a strain on local storm drainage facilities there, though not on the main flood control channels. On January 10, the flood control facilities were strained, but everything worked well and there were no major problems, partially because there was excellent communication of weather to be expected well ahead of time.
- o QPF was the most-used NWS product. They appreciated that more QPF points were added after the '92 floods. They also appreciated the QPF updates at other than the normally scheduled times (4 AM and 2:30 PM), but stated that they should somehow be alarmed so they knew when they were available. They would like the NWS QPF to be for three-hour periods instead of 6-hrs, they would like them to be updated more frequently, and would like them to go out to 3 to 5 days instead of just 24 hours (like the private meteorologists provide).
- o The second-most heavily used NWS products were the extended forecasts, since the Corps needs as much lead time as possible in order to plan for reservoir operations. Essentially all COE reservoir operations in southern California are for flood control specifically.
- o They believe that their relationship with the NWS has greatly improved since the 1992 floods, and this has helped them in their reservoir control duties. There was plenty of lead time and coordination, so that, for example, the Sepulveda Basin could be cleared out before water backed up into it this time.

SANTA BARBARA COUNTY: Agencies visited: Santa Barbara Flood Control District (SBFCD) and Santa Barbara Office of Emergency Services (SBOES):

- o Both agencies were pleased with the issuance of advisories, watches, and warnings from the NWS. The Flash Flood Warning (FFW) issued at 12:45 a.m. on the 10th was a key decision point and brought definitive action from their agency. The SBFCD showed us on their ALERT computer how the FFW came right before the hydrograph made a sharp rise to flood level for one of the most problematic creeks in Santa Barbara County.
- o Lead time for many creeks coming off the Santa Ynez

Mountains is only 20 - 30 minutes for residents of Santa Barbara, so flood preparedness is the key to limiting injuries, fatalities, and property damage. Both agencies see this post-flood time as an opportunity for increased public education on what exactly the various NWS products mean (i.e. watch vs. warning) and what actions should be taken by affected residents. SBOES will pursue getting an article or public information statement out through the media, especially the newspaper.

- o The SBFCO receive products from the NWS through NOAA Weather Radio, phone calls from NWSFO Los Angeles or WSO Santa Maria, over ALERT, and over CLETS through SBOES. They feel communication with the NWS is good. However, they rely heavily on WSO Santa Maria, and are a little concerned about the level of service after that office closes. They do have a good relationship with the Oxnard office also, and feel that any problems can be worked out for everyone's benefit.
- o Neither the SBOES or SBFCO have a NIDS vendor for WSR-88D products, and do not plan to acquire the service. Currently, they rely on the Weather Channel and NWS text discussions or phone conversations for radar information.
- o QPF is received over ALERT or by phone. The SBFCO also use a private forecaster's QPF and compare the two products. They use QPF as input to a runoff model for "flashier" streams and determine possible areas of concern and staffing needs based on this information.
- o They are concerned about efforts to increase lead time on Warnings because of the unpredictability of storms moving in and the possibility of blowing a warning, which they feel would very strongly reduce the public's confidence in future NWS warnings. However, they understand the benefits of the WSR-88D's increased resolution and ability to see winds and are willing to experiment with lead times of an hour, possibly two, for the rest of the season.

MEDIA: The survey team met with the following radio and TV stations. Following is a summary of their comments regarding NWS performance during the storm period in question.

KCAL Channel 9 (Los Angeles)
KABC Channel 7 (Los Angeles)
KTTV Channel 11 (Los Angeles)
KNX Radio (Los Angeles)
KETV Channel 3 (Santa Barbara)

- o The NWS has a good cooperative relationship with the

media, who thought the storms were handled very well. During the event some stations cut into their regular programming with weather updates once per half hour. Most used NWS products and data directly, without editing. They noted that the NWS staff were always available for comment, and not too busy to talk about the weather situation. Comments from KABC, KTTV, KCAL, KNX, and KETV

- o KABC uses Kavouras as their NIDS vendor and to obtain other weather information. Having the radar data was very helpful in explaining to the public qualitatively what was going on, and where the heaviest precipitation was occurring. They thought that the radar precipitation amount products were "pretty worthless".
- o KTTV receives their weather information via WSI, as well as AP and City News Service. They are in the process of updating their WSI NIDS radar service, so for this event, they relied on the WSR-88D mainly indirectly through improved NWS watches and warnings.
- o KCAL receives their weather information via WSI and City New Service, and get NEXRAD radar data from WSI, although they rely on the NWS for most of the meteorological interpretation.
- o KNX relies completely on NWS products and uses them directly. They don't have their own weather person, though they sometimes do interview the KCBS TV weatherman (located in the same building) during storms. They receive weather products via AP, UPI and City New Service. They are made aware of watches, warnings and flood advisories immediately, when these products are available they "beep" at the terminals.
- o KNX had no NIDS connection to the WSR-88D and do not plan to obtain any service, so they can use as much textual radar summary information as the NWS can provide. They also appreciate rainfall totals, records, or other interesting weather facts.
- o Because southern California is normally dry, the public is often confused by the difference between watches, warnings and advisories (what's life-threatening, what's not?). It was especially confusing when more than one product is out at the same time. They recommended that definitions be included in each product, as well as a "nutshell" summary when multiple warnings are in effect. They were confused by the fact that a warning supersedes an advisory and watch, and that if an advisory or watch were in effect when a warning was issued, they are not

formally cancelled. Comments from KABC, KTTV

- o They strongly believed that the NWS needed to keep the TV or radio news on while there is a storm so that they can monitor what's going on. The local TV stations have helicopters and live news trucks all over the area looking for trouble spots. If it looks important, they put it on the news. Comments from KABC, KCAL
- o They put in a strong pitch to **SAVE THE OFFSHORE BUOYS!** This information is vital for reporting on heavy swells which can affect the many piers, heavily used beaches, surfing interests, and the many homes which are located close to the high tide line. Comments from KABC
- o They especially liked having regular updates and summaries of what weather was going on in the region; they also liked and used the precipitation totals products, and would like the data to be organized geographically. Comments from KCAL, KNX, KETV
- o They, like all the other TV stations which we visited, always look at the SFDs, and thought they were generally extremely valuable, especially when they discussed what was/will be going on and why. They said that the SFDs aren't as valuable to the media when they spend a lot of time comparing models, and going into a lot of very technical meteorology. However, we explained that this is meant to help out other meteorologists who may be looking at the same guidance packages. Comments from KCAL, KABC, KTTV
- o They noticed that sometimes there needed to be better coordination between the MRY and LOX offices in the Santa Barbara/San Luis Obispo County areas, since the forecasts sometimes didn't mesh. Comments from KCAL
- o During the past season, the NWS has been very proactive in informing people (through the media) about upcoming weather problems through watches, warnings, advisories and statements. Forecasts have generally been "right on the money"; even the five day forecasts are generally of very good quality. Warnings were issued well in advance, and were worded emphatically to get the public's attention. Comments from KNX
- o KETV relies heavily on WSO Santa Maria for information, although they did have some contact with NWSFO Los Angeles. They are a little concerned about the closure of the Santa Maria office but are optimistic about greater contact with the Oxnard office.

- KETV felt the WSR-88D was critical in providing increased lead time and more accurate warnings.

PART III: DISSEMINATION Emergency managers, flood control districts, the media, and the public receive NWS products via a variety of dissemination systems. As discussed in Part I, the lack of a uniform method of disseminating NWS products in text form to emergency managers is a problem that should be addressed. In addition to the Family of Service Public Products Service, the following systems are used to

ALERT: This is the primary system by which the NWS disseminates warnings and forecasts to flood control districts and many emergency managers. The following flood control districts have automatic reception of forecasts, warnings, and statements, Santa Barbara, Ventura, Los Angeles, Orange, Riverside, and Coachella. As soon as any product is issued from the Forecast office, a program called "rcv_fcst" is activated, which automatically downloads that product to the corresponding flood control ALERT computer. It is up to their discretion to have an alarm sound on reception of any product. In addition to automatic reception of products, many users can view products at their desired time by dialing into the NWSFO ALERT Bulletin Board Service. Warnings, statements, forecasts, and observations are available on this service. Bulletin Board users include:

U.S. Corps of Engineers
Orange County Flood Control District
LA County Flood Control District
San Bernardino Flood Control District
Riverside Flood Control District
LA OES
LA County Fire
LA County Health Department
Department of Water Resources
Coachella Water District
California-Nevada RFC
NOAA (San Diego)
Southern California Edison
Edwards Air Force Base
Marine Exchange
City of Palmdale
Tom Hemphill (Mountain observations)
Bob Footlick (Newhall observer)
Bob Webster (Port Meteorological Officer)

CALIFORNIA LAW ENFORCEMENT TELECOMMUNICATIONS SYSTEM (CLETS): One of the primary means of dissemination in California is through CLETS. CLETS receives NWS warnings and statements via the State NWS drop in Sacramento. These products are then manually transferred from NWS into CLETS and routed according to UGC. County OES, and several major cities receive CLETS. Other information on CLETS includes law enforcement and highway information. Due to retransmission and information congestion

problems, NWS warnings sent via CLETS can take up to 10 to 20 minutes to reach county OES offices.

NWR: There are two NWR transmitters in the Los Angeles - Santa Barbara area. They are located on Mt. Wilson in Los Angeles county and on Broadcast Peak in Santa Barbara county. Maps depicting the effective range of these NWR transmitters are contained in Appendix A.

MEDIA TELEPHONE LINE: A dedicated telephone line is answered at the NWSFO twenty-four hours-a-day for members of the media. As discussed earlier, during periods of severe weather a dedicated shift is assigned just to handle the extremely large number of media inquires in the Los Angeles area. During the four day period from 5 a.m. on January 7 to 4 a.m. on January 11, 270 media calls were logged at the NWSFO. An estimated 50 calls not logged due to lack of time. Of the 270 calls ten were national radio interviews and 5 were national TV interviews.

PUBLIC TELEPHONE LINE: Public telephone calls are answered by the public service unit from 8 a.m. to 4 p.m. from Monday through Friday. During the time when the calls are not answered an automatic "attendant system" provides the caller with a menu of recorded forecasts for different areas in the Los Angeles Basin. The public telephone becomes saturated during periods of significant weather due to the population density in the area.

NWWS: There are only two users who subscribe to NWWS in the Los Angeles areas. The two users are the City News Service and Southern California Edison. Hence NWWS is not a primary means of disseminating NWS forecasts and warnings.

EMERGENCY DIGITAL INFORMATION SYSTEM (EDIS): EDIS is a system which provides local, state and Federal agencies with a direct computer link to the news media and each other during emergencies. EDIS uses a network of digital radio transmitters to distribute warnings, news releases, and advisories in the metropolitan areas of California. Receivers using inexpensive "packet radio" equipment output EDIS messages to computers. In the Los Angeles area EDIS transmitters are located on Mt. Wilson (same location as NWR), Ventura County (County Government Center), and on Rim Forest (in Riverside). NWS warnings and statements are transmitted on the EDIS system. Ventura County OES is the only emergency services agency which we interview who utilize EDIS to receive NWS products. None of the media outlets interviewed by the survey team use EDIS.

NAWAS is used to verbally alert county OES coordinators that a warning has been issued. The warning is read over NAWAS to the operator who must write down the information before it can be disseminated further. Warnings can be called to individual counties or groups of counties when issued via NAWAS. In this

manner, the NWSFO verifies that each county coordinator has received the warning.

PART IV: FLOOD DEATH - DAMAGE SUMMARY AND SAMPLE STORM TOTAL
PRECIPITATION

DEATHS: Six deaths were caused by the heavy rains and flooding in Southern California during this storm period, as detailed below: An untold number of persons were injured with several very dramatic rescues of persons trapped by or in the flood waters by emergency responders. Many of the persons rescued were homeless people who lived on the banks of the Ventura River. Scores of people were forced to evaluate their homes and/or businesses.

Summary of the six deaths:

1. At Camp Pendleton a U.S. Marine Corps Lt. Col. was drowned while attempting to cross a flooded stream on January 10.
2. In Orange County a 12 year old boy drowned while trying to cross a creek. He was tethered to companions by an extension cord, but it snapped when he fell into the water. Event occurred January 10.
3. A falling tree killed a Templeton man working in Cambria (San Luis Obispo County) on January 4.
4. A woman was killed when she was struck by two cars while crossing a flooded intersection in Chatsworth (Los Angeles County) on January 4
5. A man died of carbon monoxide poisoning in his car in Long Beach (Los Angeles County) when high water filled the exhaust pipe of his still running but stranded car on January 4.
6. A mans body was found floating in the Ventura River, presumably from flooding on the 10th.

FLOODING: The most serious flooding that occurred in the area assigned to this survey team (NWSFO Los Angles CWA) occurred in Santa Barbara, Ventura, and Los Angeles counties as described below. However, the reader should remain mindful that some degree of flooding was widespread over the area during most of the 8 day event

In Santa Barbara County the most serious flooding occurred in the central and southern part of the county during the morning of January 10, 1995. The small creeks involved with the flooding were very "flashy". They drain small watersheds, thus they all had receded by the noon of the 10th. The main problems that led to the flooding was the silting and high sediment counts that had occurred due to the rainfall. Also, debris-plugged bridges, culverts, and roads which lead to constrictions of natural pathways and resulted in many road closures and urban flooding problems. Thus, the

intensity of the rainfall was not the major contributing factor to the flooding. Less rain fell in the northern county where the larger watersheds are located and no problems were reported. Minor flooding occurred on the Santa Ynez River west of Lompoc in the agricultural low-lying areas due to extra spill from Cachuma Dam. Specific locations of flooding included: Mission Creek in Santa Barbara; Sycamore Creek near Highway 101, San Pedro Creek at Goleta; Montecito Creek at Montecito; Buena Vista Creek at Montecito, and Oak Creek at Montecito. No problems occurred on the Atascadero Creek, which has always been a flash-flood prone area, due to major channel clearing prior to the rains. In the County there were 543 homes and 68 businesses flooded with an estimated \$114M in property damage (\$97M public and \$17M private) as a result of the floods from January 3-11.

In Ventura County, the Ventura River at Main Street overtopped its banks on January 10th and levee damage occurred at Live Oaks Acres and Casitas Spring. Similar problems occurred in Ventura County as in Santa Barbara County with the deposit of large amounts of debris due to the continuous rainfall. Consequently, bank restoration is planned in several locations including Santa Paula Creek at Mupu school, along Arroyo Simi, Fagan Canyon downstream of the dam, Conejo Creek at Two Breaches and along Adolfo Road to Upland Road, and Calleguas Creek downstream from Lewis Road. The estimated damage to public facilities was \$12.8M. The damage to private property is unknown but 66 homes/apartments were damaged (28 suffered major damage) from the January 3-11 event.

In Los Angeles County major street flooding occurred in the southern portion of the County due to high intensity rainfall on January 3 and 4. Most of the flooding was a result of local storm drains and channels being overtaxed. Damages on January 4 include the flooding of 200 structures and 100 vehicles abandoned in ponded areas. Total estimated damage to public and private property is approximately \$6M for the January 4 portion of the event.

SELECTED PRECIPITATION AMOUNTS:

Santa Barbara County:	Santa Maria	7.0"	(Jan 3-12)
	Santa Barbara	16.7"	(Jan 3-12)
	Gibraltar Dam	22.2"	(Jan 3-12)
	Lompoc	10.9"	(Jan 1-15)
	Cuyama	4.4"	(Jan 1-15)
	San Marcos Pass	25.1"	(Jan 3-11)

One of the heaviest rain periods from Jan 3-12 occurred from 2 pm on the 9th to 2 pm on the 10th. These 24 hour totals are:

Gibraltar Dam	8.35"
Juncal Dam	10.08:

San Marcos Pass 9.13"

Ventura County:

Ventura City 12.1" (Jan 3-12)

One of the heaviest rain periods from Jan 3-12 occurred from 2 pm on the 9th to 2 pm on the 10th. These 24 hour totals are:.

North Fork

Matilija Creek 12.32"

Matilija Canyon 8.15"

Nordoff Ridge 8.54"

White Ledge Peak 9.45"

Long Canyon 4.69"

Simi Arroyo 3.46"

Ventura 4.55" (4 pm - 4 pm)

Note: Due to ALERT data base problems, storm totals are missing for these locations.

Los Angeles County:

Civic Center 9.43" (Jan 3-12)

Malibu 13.3" (Jan 3-12)

Santa Ana 8.6" (Jan 3-12)

Orange County:

Laguna 8.9" (Jan 3-12)

PART V: METEOROLOGICAL ANALYSIS

The large scale pattern from January 3-12, 1995 consisted of a progressive broad long wave trough in the eastern and central Pacific (see the MRF 500 mb height analyses in Figure 1). This trough in combination with an upper latitude blocking ridge in the Gulf of Alaska developed a warm type conveyor belt of tropical moisture into California. Likewise a series of short waves moving through this long wave trough position continued to batter the state through this period. Precipitation amounts from orographic forcing alone would have been substantial, but combined with strong dynamical forcing produced record rainfall rates at many locations.

From January 12-15, 1995 the large scale pattern was undergoing some adjustments as the broad long wave trough consolidated into a smaller trough at 130W (Figure 5). This change broke the tropical moisture connection, but still provided one last precipitation episode in California Friday night and Saturday. The daily details throughout this storm period are described below.

Tuesday, January 3: The first short wave undercuts the Gulf of Alaska ridge and begins to affect California by providing widespread rain over the state. This first system saturated most of the river basins while not causing extensive flooding (Figure 6a and b). A 55 kt jet at 500 mb entered southern CA providing upper level support and moisture for this storm. Downtown Santa Barbara recorded 0.98 inches of rain in 30 minutes during the morning. Winds in the east Santa Barbara channel were sustained at 40 mph over several hours.

Wednesday, January 4: Another system is fast approaching the CA coast with the primary track over southern CA. This storm was noticeably stronger than on Tuesday with larger vertical motion fields and a stronger upper level jet (Figure 6b and c). Due to these differences, winds were substantially stronger with gusts of 52 mph at San Diego, 77 mph at Sudden Peak, and 90 mph at the Wheeler Ridge Pumping Station in the south end of the San Joaquin Valley.

Precipitation amounts were also substantially greater than the previous day: Palos Verdes Peninsula 5.75", Gibraltar Dam 3.39", Santa Barbara 2.40", and Santa Maria 1.94". South coast sites generally reported between 2 to 4 inches. The maximum precipitation in the northern end of the state was 1.29 inches in west Fresno county and over 5.00" in Monterey county.

Thursday, January 5: Transition period as the Gulf of Alaska ridge begins to retrograde from 130W to 150W. Winds continue to be in the 25 to 50 mph range with surfs 8-10 feet. Precipitation was light across the state.

Friday, January 6: A series of systems are now lined up across the Pacific. The strong upper level jet has shifted northward toward the San Francisco Bay Area. Warm air advection-induced precipitation and precipitation bands occur over the northern portions of the state. Rainfall accumulations were light during the day with heavier amounts towards evening as an impulse moved rapidly through central CA producing scattered areas of heavy rain and winds up to 60 mph in valley locations.

Figure 7 illustrates the significant weather forecast near the San Francisco Bay Area for the next 48 hours beginning the morning of January 6. Notice the strong vertical motion field (Omega), the complete saturation of the atmosphere (RH field) late Friday night, and the veering of winds with height indicative of the moist warm air advection.

Saturday, January 7: Strong moist flow still entering CA with the 500 mb jet axis entering the state over San Luis Obispo. Morning showers linger in the northern CA mountains with a weakening frontal boundary moving into southern CA through mid-day. Winds have subsided in the north, although remained gusty near convection in the south. Stations in Santa Barbara county reported precipitation amounts of 1-2 inches by morning.

Another storm rushes from the Pacific towards northern CA by evening. The majority of the energy from this system will strike northern CA on Sunday as winds again jump up to 55 mph before midnight. Previous rains in northern CA have now saturated the ground.

Sunday, January 8: Figure 8 emphasizes the amount of tropical moisture entering the state in the early morning hours. Heaviest precipitation starts in the coastal range near the Russian River and the Napa Valley. Coastal range rainfall rates were up to 3.0" in a 6 hour period during the morning. By afternoon this system moved into the North Bay Area with similar rainfall rates of 2-3" in 6 hours. Later in the evening gale force winds occurred near the Golden Gate Bridge with swells of 14 to 20 feet. The major precipitation areas in the evening moved to Mount Shasta and Siskiyou county. Twenty four hour rainfall rates ranged from 3 to 6 inches. All of this precipitation resulted in runoff, since soils were saturated from previous rains.

Monday, January 9: Figure 9 depicts the atmospheric vertical motion and speed of the moist air mass moving through California. The winds are close to 100 knots at 500 mb, which caused 40-70 mph surface winds throughout the day and mountain winds close to 110 mph. Intense one inch per hour rainfall rates were observed in much of northern and central

California. Two exceptional rainfall rates, resulting from convective bands embedded in the widespread precipitation, were: downtown Colusa with 2" of rain in 30 minutes and Sacramento 1.29" in 30 minutes. Satellite imagery from Monday afternoon (Figure 10) depicts the massive amount of low level moisture moving into the state. Notice the blocking of this moisture by the Sierra Nevada and Cascade mountain ranges.

As figure 10 shows, moisture did move into southern California, although precipitation rates were not as dramatic as observed up north. These rates were lesser since the dynamics (vertical motion) associated with this phase of the storm were weaker further south. Rainfall measurements before midnight were generally less than 0.5 inches.

Tuesday, January 10: The system which affected the state on Monday continues to move slowly eastward and south. As this system departs by early Wednesday morning, the tropical moisture feed is broken. Significant rainfall rates in the north (1" per hour over 3 hours) occurred in the morning of the western valleys and Sierra foothills. Severe thunderstorms, with possible tornadic activity, were observed in the Sacramento and San Joaquin valleys during the afternoon, which illustrated the instability of the atmosphere in the north.

The tropical moisture and vertical motion fields shifted to the south as heavy precipitation amounts were reported in Santa Barbara, Orange and Los Angeles county. Satellite imagery (Figure 11) depicts the last areas of tropical moisture in southern CA before the storm leaves the state.

January 11-15: The tropical moisture connection is broken, although showers linger in southern CA early Wednesday. A ridge builds over the state late Wednesday and Thursday providing pleasant weather. A "normal" storm system moving into the state Friday afternoon (1/13) and Saturday (1/14) provided some warm air advection precipitation. Amounts were relatively light, in comparison to the previous week, with maximum amounts near 2 inches in a 24 hour period.

In summary, these storms provided the heaviest precipitation in southern California on Wednesday January 4, and the northern portion of the state on Monday January 9.

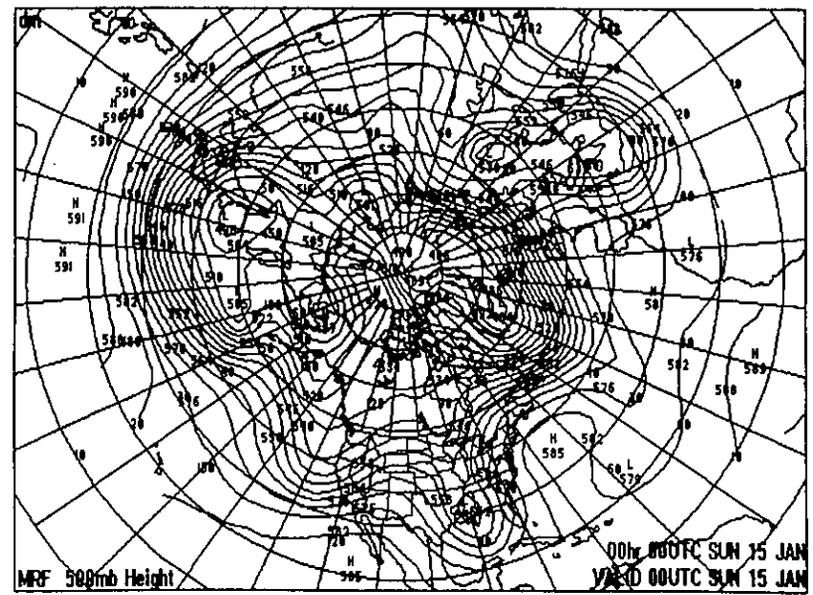
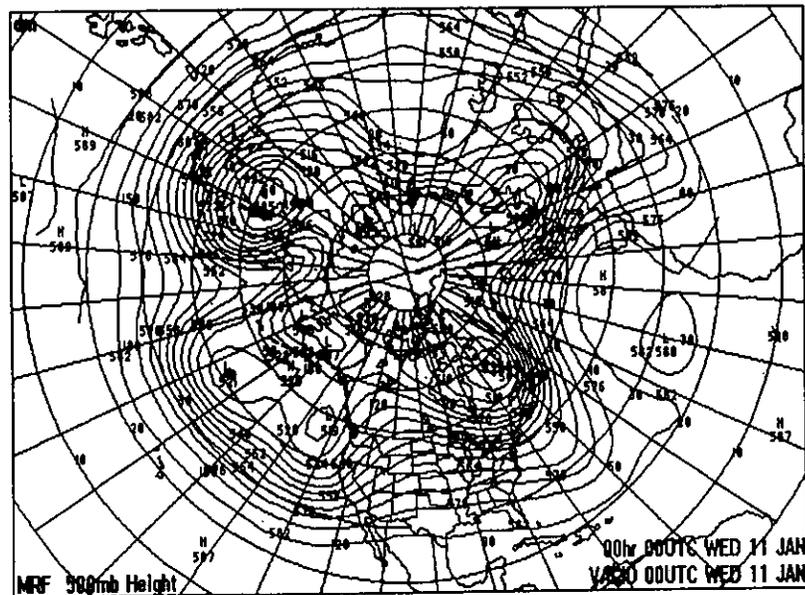
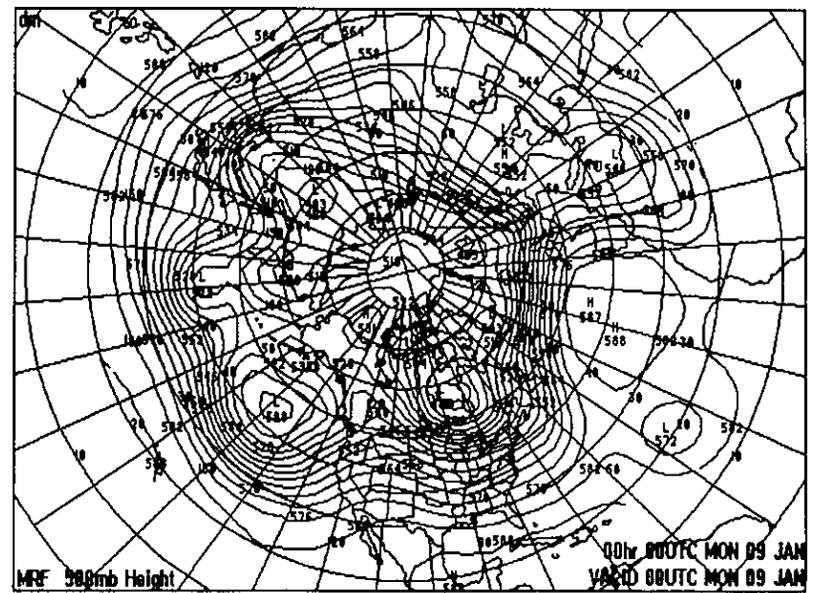
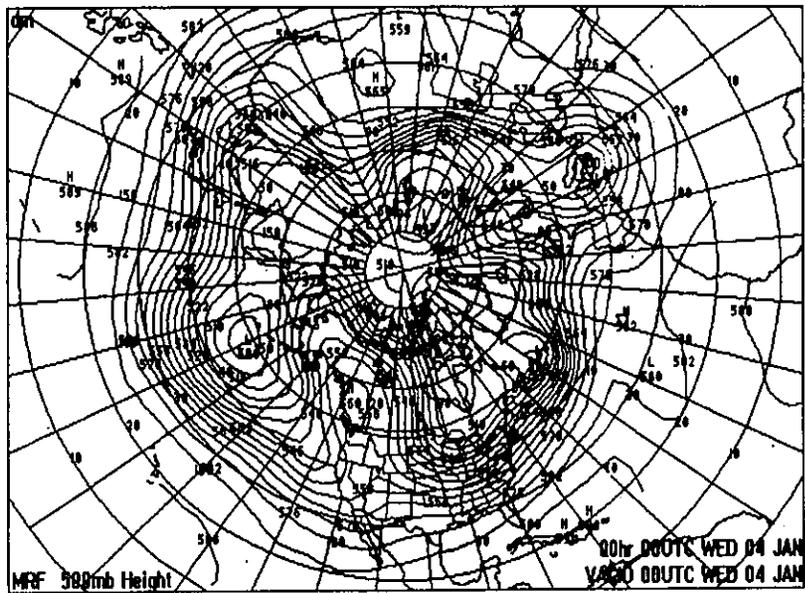


Figure 5 - Northern hemisphere 500 mb height fields at 00 UCT for January 4, 9, 11 and 15, 1995.

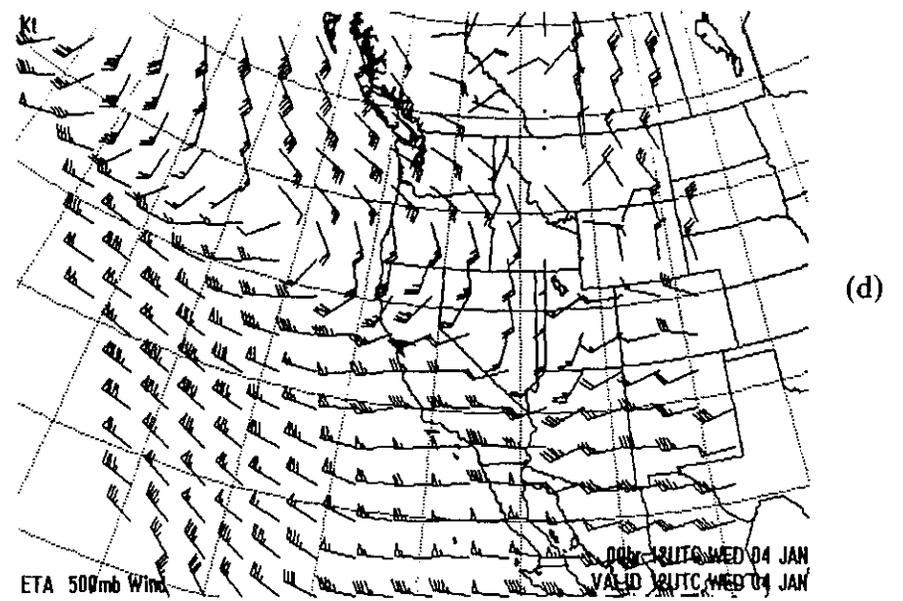
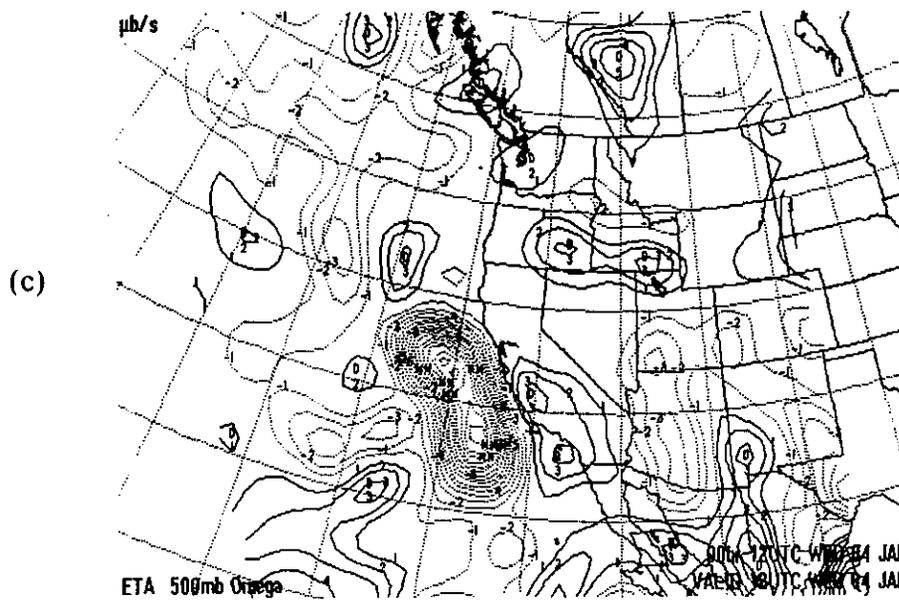
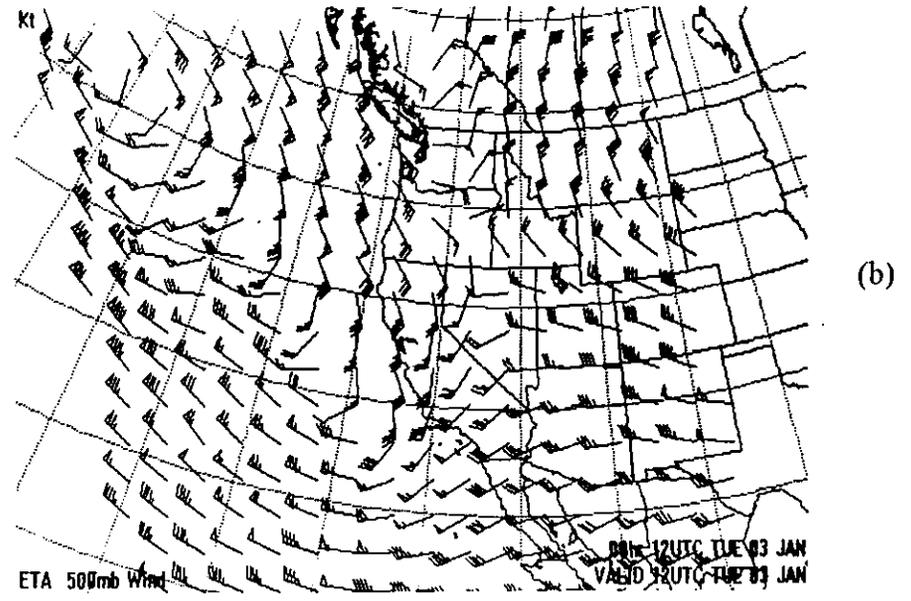
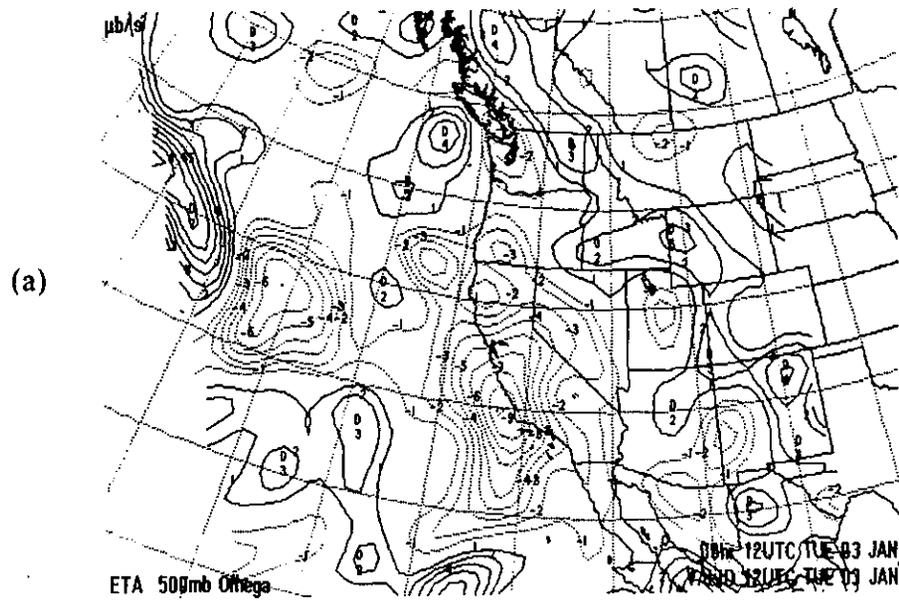


Figure 6 - (a) 500 mb vertical velocity and (b) wind field for 12Z January 3. (c) 500 mb vertical velocity and (d) wind field for 12Z January 4.

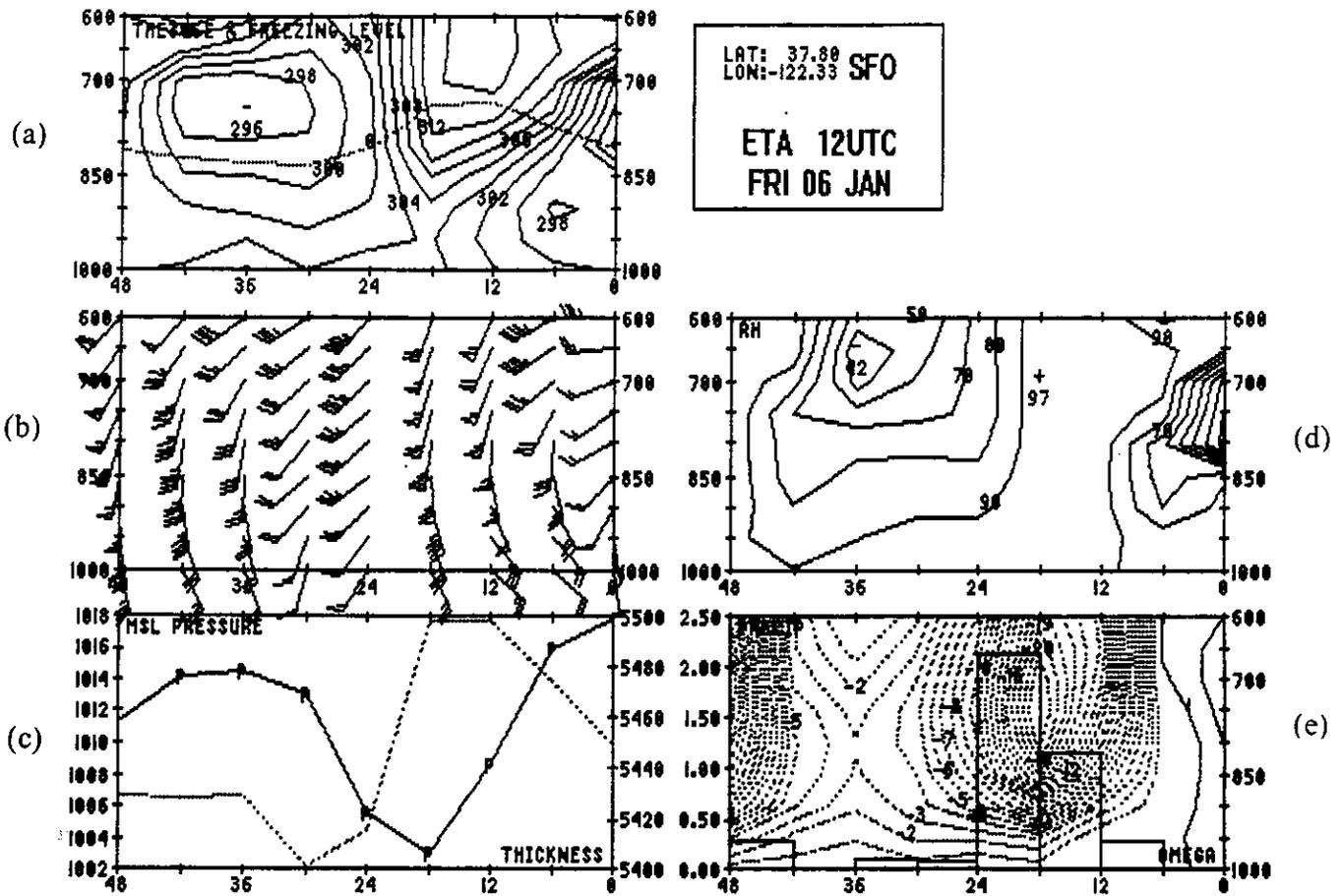


Figure 7 - Forecast fields from the ETA model run on January 6 at 12Z: (a) theta-e and freezing level, (b) winds, (c) sea-level pressure and thickness, (d) relative humidity, and (e) vertical motion and precipitation.

0730 08JA95 19E-42A 00831 18191 CC2

G

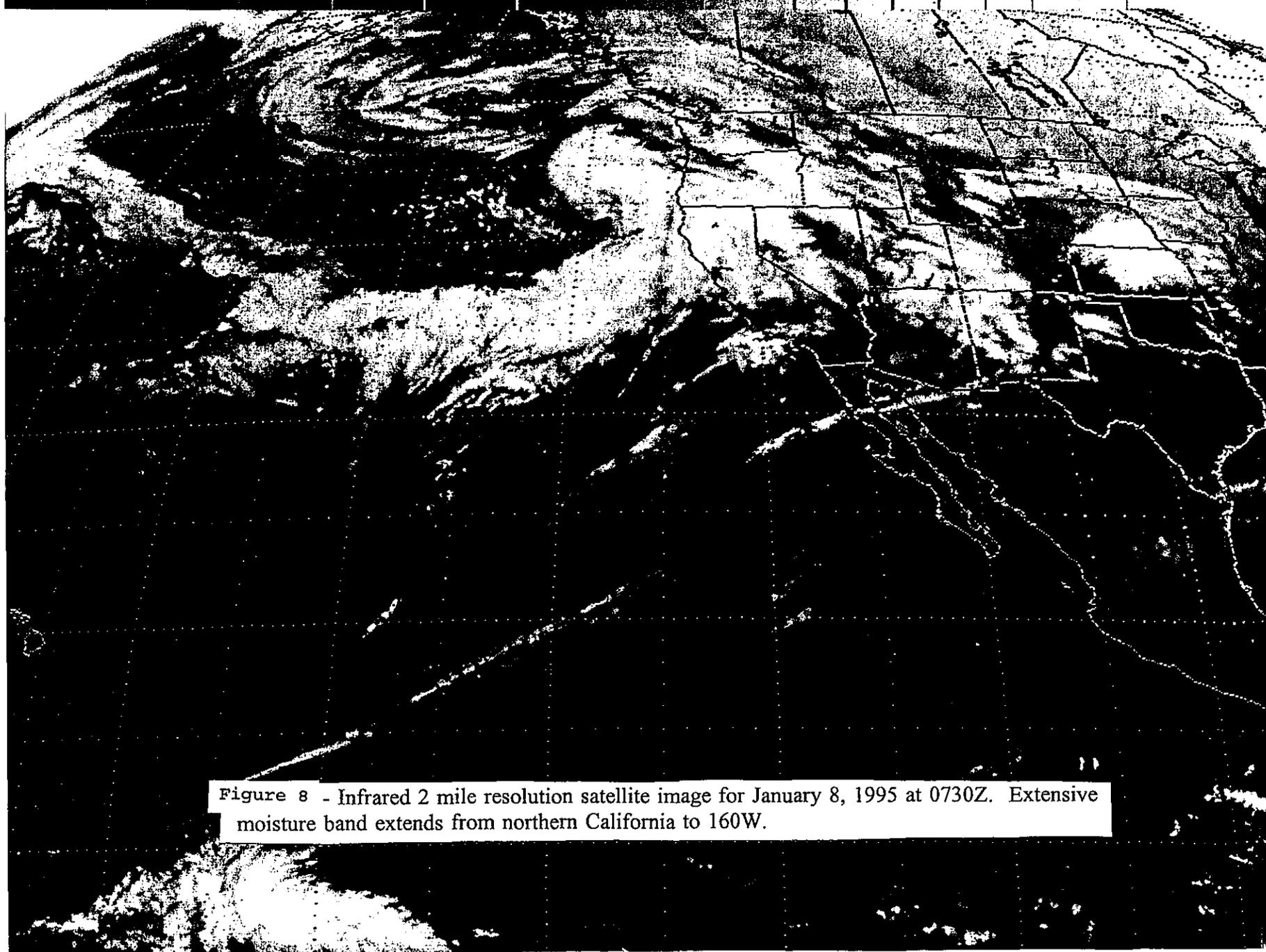


Figure 8 - Infrared 2 mile resolution satellite image for January 8, 1995 at 0730Z. Extensive moisture band extends from northern California to 160W.

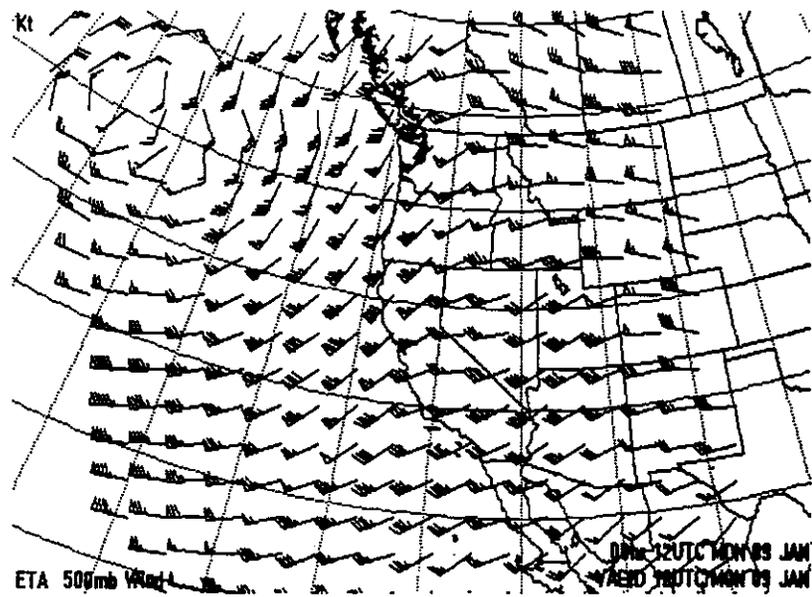
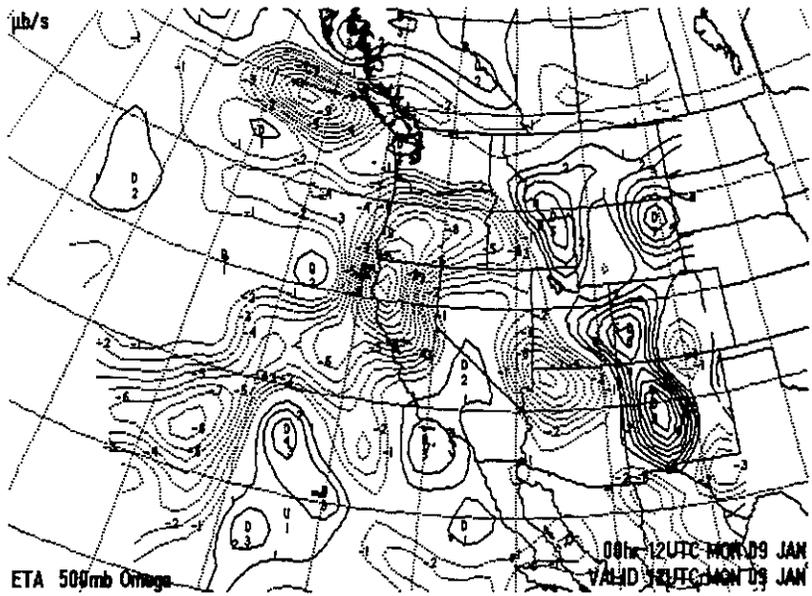


Figure 9 - Vertical motion and wind fields for Monday January 9 at 12Z.

2130 09JA95 29E-4ZA 00685 14731 WC1

G

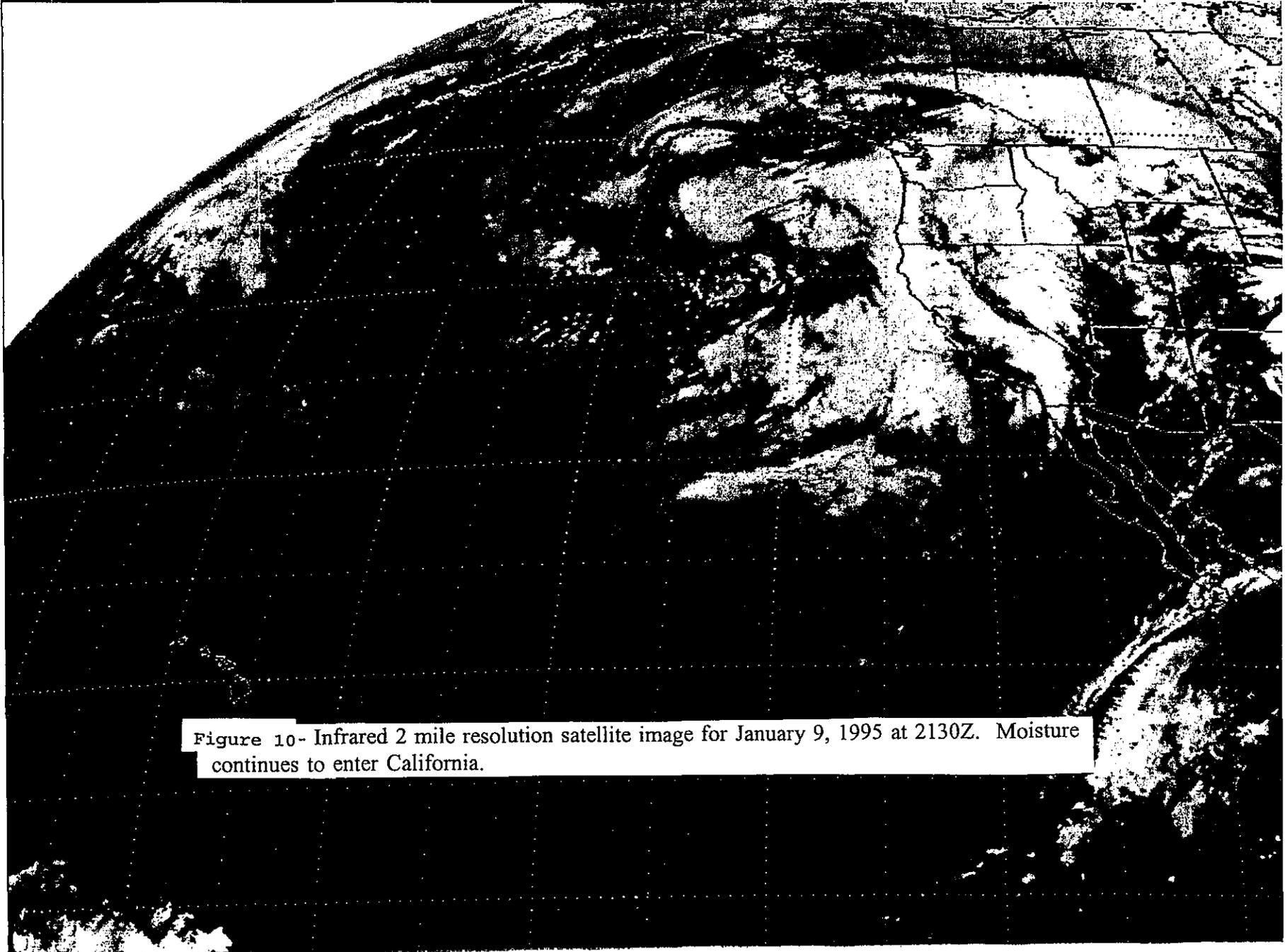


Figure 10- Infrared 2 mile resolution satellite image for January 9, 1995 at 2130Z. Moisture continues to enter California.

1630 10JA95 29E-4ZA 00634 14781 WC1

G

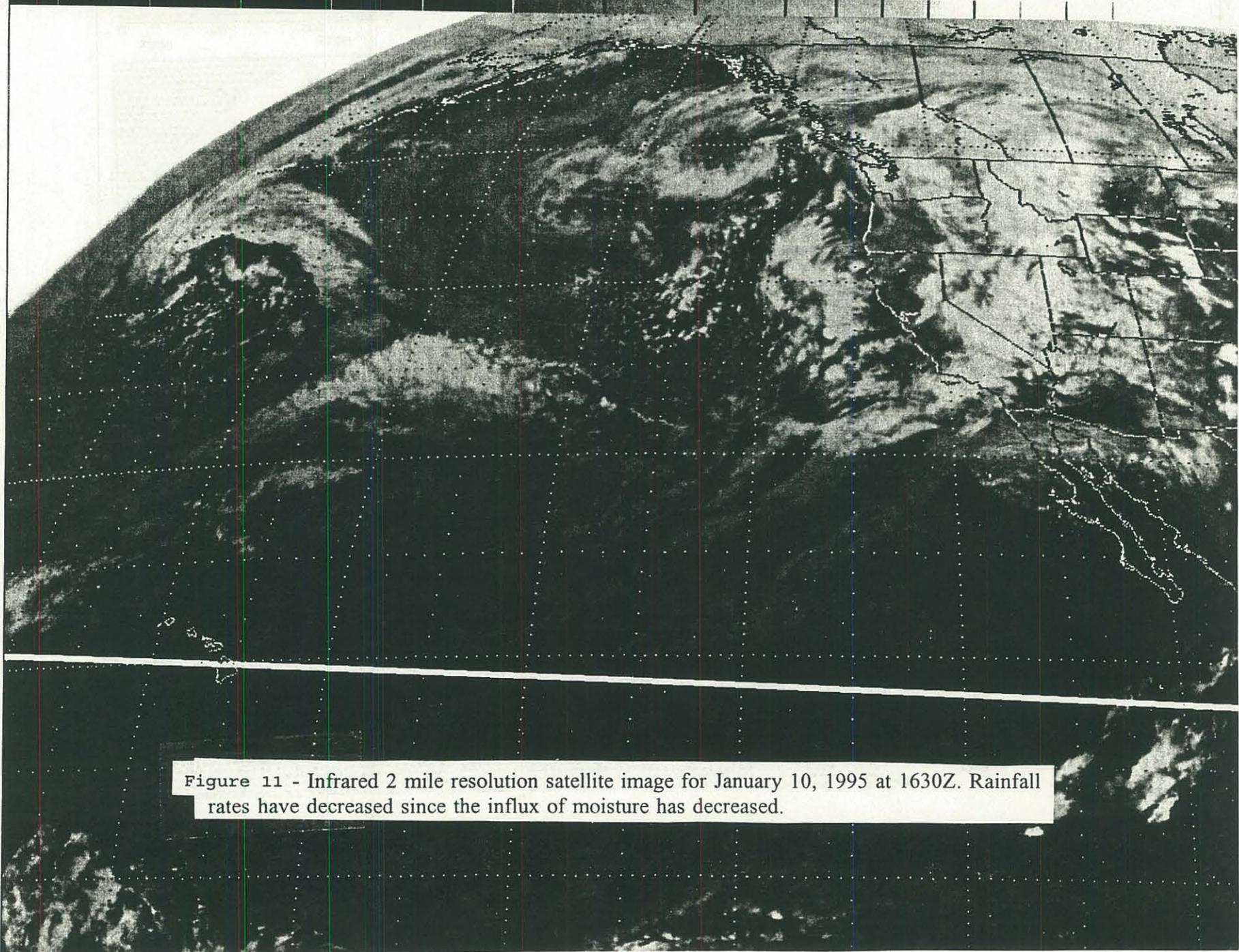
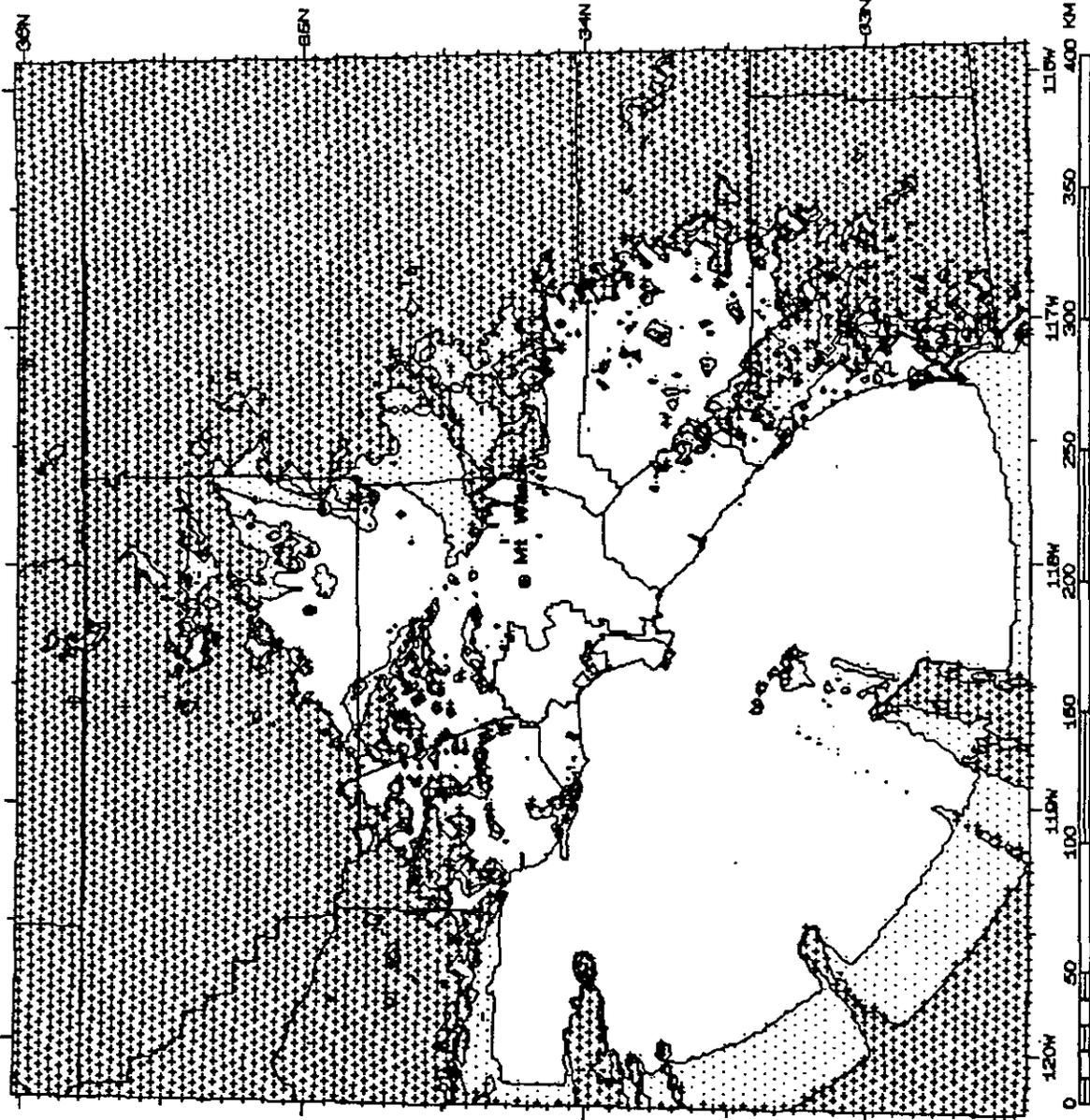


Figure 11 - Infrared 2 mile resolution satellite image for January 10, 1995 at 1630Z. Rainfall rates have decreased since the influx of moisture has decreased.

FWZ
Forrest Gray
Mt Wilson
15-Mar-66 07:23:48

Field Intensity (dBuV/m)

□	Greater than 30.00
	Area: 54760. sq km
	Population: 12978000.
	Households: 4401000.
□	20.0000 to 30.00
	Area: 16120. sq km
	Population: 1488000.
	Households: 521000.
▣	Less than 20.0000
	Area: 66170. sq km
	Population: 2013000.
	Households: 660000.

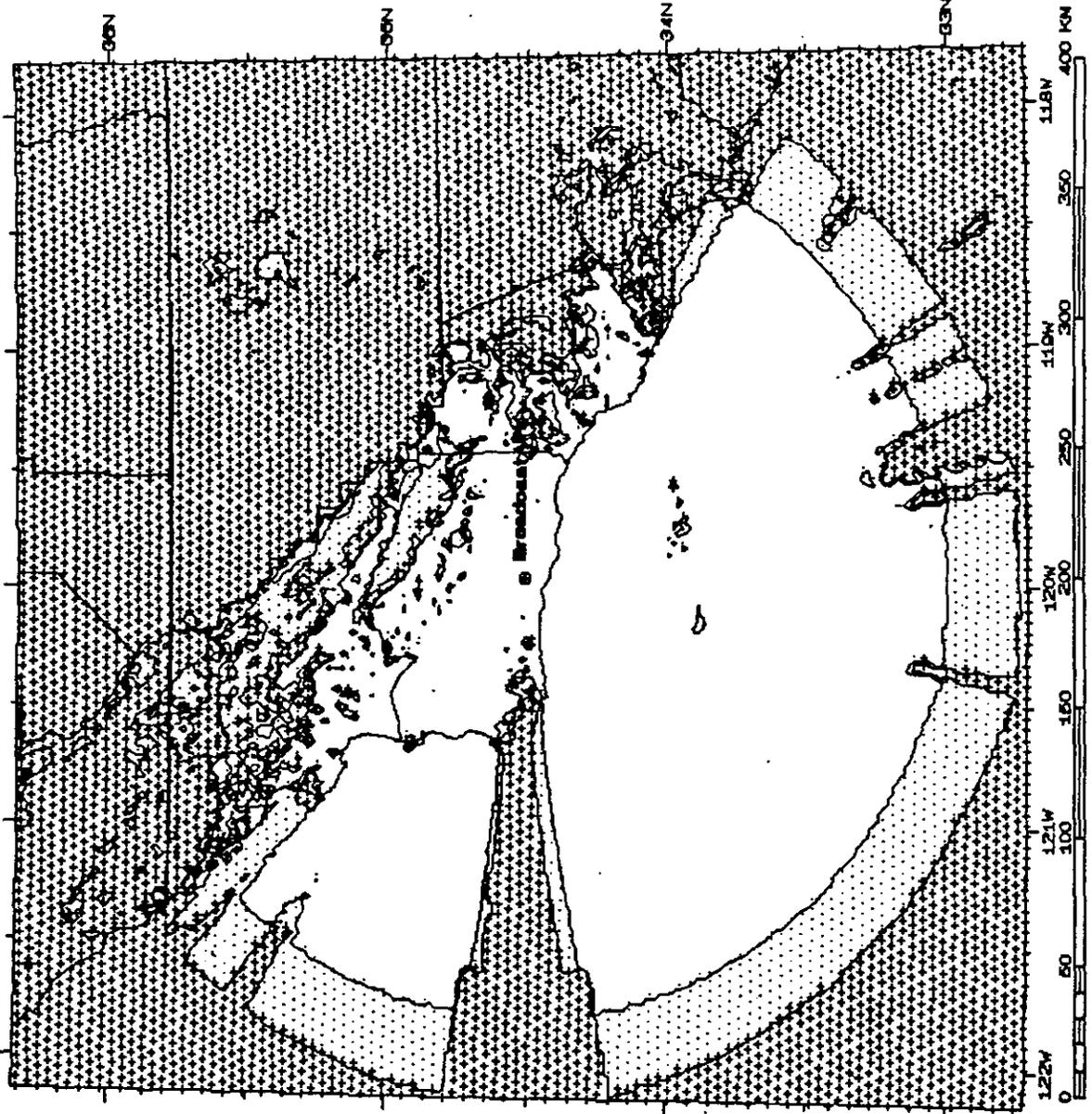


BROADCAST PEAK NWR
 SANTA BARBARA COUNTY

NWS
 Forrest Gray
 Broadcast PK
 15-MAR-95 07:28:16

Field Intensity(dBµV/m)

□	Greater than 30.00
	Area: 53060. sq km
	Population: 1082000
	Households: 378000
□	20.0000 to 30.00
	Area: 24130. sq km
	Population: 928000
	Households: 333000
▣	Less than 20.0000
	Area: 82800. sq km
	Population: 9782000
	Households: 3278000



**Appendix B - Quantitative Precipitation Forecasts Issued by NWSFO
Los Angeles at Oxnard**

QUANTITATIVE PRECIPITATION FORECAST
NATIONAL WEATHER SERVICE OXNARD CA
400 AM PST TUE JAN 3 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY....					
SANTA MARIA	4 (3)	3 (0)	1 (0)	0 (4)	(8,7)
SANTA BARBARA	5 (13)	4 (0)	1 (0)	0 (1)	(10,14)
GIBRALTAR DAM	9 (16)	7 (0)	3 (0)	0 (1)	(19,16)
VENTURA COUNTY....					
VENTURA	4 (8)	4 (0)	1 (0)	0 (1)	(9,9)
TODD BARRANCA	6 (5)	6 (0)	1 (0)	0 (0)	(13,5)
LAKE SHERWOOD	5 (5)	5 (1)	2 (0)	0 (0)	(12,6)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	4 (6)	5 (0)	1 (0)	0 (1)	(10,7)
LOS ANGELES CIVIC CNTR	4 (3)	3 (1)	1 (0)	0 (0)	(8,4)
MOUNT WILSON	5 (1)	4 (M)	1 (0)	0 (0)	(10,M)
ORANGE COUNTY.....					
SANTA ANA #219	3 (0)	2 (1)	1 (0)	0 (0)	(6,1)
LAGUNA BEACH	3 (4)	2 (0)	1 (0)	0 (0)	(6,4)
SANTIAGO PEAK	3 (4)	2 (4)	1 (0)	0 (0)	(6,8)
RIVERSIDE COUNTY....					
RIVERSIDE	2 (0)	3 (4)	1 (0)	0 (0)	(6,4)
TEMECULA	2 (1)	3 (3)	1 (0)	0 (0)	(6,4)
BANNING PASS	2 (1)	3 (6)	1 (0)	0 (0)	(6,7)
SAN DIEGO COUNTY....					
OCEANSIDE	2 (4)	2 (1)	0 (0)	0 (0)	(4,5)
MOUNT PALOMAR	2 (2)	2 (6)	0 (0)	0 (0)	(4,8)
SAN DIEGO LINDBERGH FLD	2 (0)	2 (6)	0 (0)	0 (0)	(4,6)
EL CAPITAN DAM	2 (1)	2 (5)	0 (0)	0 (0)	(4,6)

THOMPSON OBJECTIVE RAINFALL SYSTEM FOR LOS ANGELES INTERNATIONAL AIRPORT
PERCENT PROBABILITY FOR THE DIFFERENT AMOUNTS OF RAINFALL LISTED BELOW:

ZERO	.01-.15	.16-.49	.50-1.50	>1.50
MM	MM	MM	MM	MM

SYNOPSIS: A COLD FRONT WILL MOVE THROUGH THE SOUTHERN CALIFORNIA COASTAL
AREAS TODAY AND THROUGH THE DESERTS TONIGHT. RAIN AHEAD OF THE FRONT WILL
TURN TO SHOWERS AFTER THE FRONT PASSES. THUNDERSTORMS ARE POSSIBLE. THE
SHOWERS WILL END FROM THE WEST TUESDAY NIGHT.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 PM PST TUE JAN 3 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	4(0)	2(4)	1(12)	7(7)	(14,23)
SANTA BARBARA	4(0)	2(1)	1(6)	7(6)	(14,13)
GIBRALTAR DAM	8(0)	1(1)	1(16)	9(17)	(19,34)
VENTURA COUNTY.....					
VENTURA	4(0)	2(1)	1(8)	5(17)	(12,26)
TODD BARRANCA	6(0)	3(0)	1(7)	7(11)	(17,18)
LAKE SHERWOOD	4(0)	3(0)	1(8)	5(14)	(13,22)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	4(0)	3(1)	1(7)	5(28)	(13,36)
LOS ANGELES CIVIC CNTR	2(0)	2(0)	1(4)	4(17)	(9,21)
MOUNT WILSON	2(0)	4(0)	1(9)	6(23)	(13,32)
ORANGE COUNTY.....					
SANTA ANA #219	2(0)	2(0)	1(3)	2(19)	(7,22)
LAGUNA BEACH	2(0)	2(0)	1(6)	2(19)	(7,25)
SANTIAGO PEAK	2(0)	4(0)	1(4)	3(8)	(10,12)
RIVERSIDE COUNTY.....					
RIVERSIDE	1(0)	3(0)	1(1)	2(10)	(7,11)
TEMECULA	1(0)	3(0)	1(0)	2(8)	(7,8)
BANNING PASS	1(0)	3(0)	1(0)	2(7)	(7,7)
SAN DIEGO COUNTY.....					
OCEANSIDE	2(0)	2(0)	1(3)	2(18)	(7,21)
MOUNT PALOMAR	2(0)	4(0)	1(0)	2(9)	(9,9)
SAN DIEGO LINDBERGH FLD	2(0)	2(0)	1(1)	2(6)	(7,7)
EL CAPITAN DAM	2(0)	2(0)	1(0)	2(5)	(7,5)

THOMPSON OBJECTIVE RAINFALL SYSTEM FOR LOS ANGELES INTERNATIONAL AIRPORT
 PERCENT PROBABILITY FOR THE DIFFERENT AMOUNTS OF RAINFALL LISTED BELOW:

ZERO	.01-.15	.16-.49	.50-1.50	>1.50
MM	MM	MM	MM	MM

SYNOPSIS: A COLD FRONT WILL MOVE THROUGH THE SOUTHERN CALIFORNIA DESERTS AT
 THIS TIME. WITH TEMPORARY CLEARING BEHIND THE FRONT. THE NEXT STORM SYSTEM
 IS EXPECTED TO REACH THE SOUTHLAND BY THIS EVENING, AND SPREAD OVER THE
 SOUTHLAND OVERNIGHT. DON'T PUT THE UMBRELLAS AWAY YET BECAUSE ANOTHER
 POWERFUL STORM IS EXPECTED TO BARREL INTO SOUTHERN CALIFORNIA WEDNESDAY
 AFTERNOON.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 AM PST TUE JAN 4 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY.....					
SANTA MARIA	4(12)	4(7)	15(3)	8(2)	(31, 24)
SANTA BARBARA	4(6)	4(6)	12(10)	8(0)	(28, 22)
GIBRALTAR DAM	8(16)	6(17)	20(11)	10(0)	(44, 44)
VENTURA COUNTY.....					
VENTURA	4(8)	4(17)	18(8)	10(0)	(36, 33)
TODD BARRANCA	6(7)	6(11)	25(2)	15(0)	(52, 20)
LAKE SHERWOOD	4(8)	4(14)	21(9)	12(0)	(41, 31)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	2(9)	2(28)	20(11)	10(0)	(34, 48)
LOS ANGELES CIVIC CNTR	1(4)	2(17)	10(11)	5(1)	(18, 33)
MOUNT WILSON	4(9)	4(23)	18(7)	10(2)	(36, 41)
ORANGE COUNTY.....					
SANTA ANA	1(3)	1(19)	8(15)	7(1)	(17, 38)
LAGUNA BEACH	1(6)	1(19)	8(13)	7(0)	(17, 38)
SANTIAGO PEAK	1(4)	1(8)	8(13)	7(9)	(17, 34)
RIVERSIDE COUNTY.....					
RIVERSIDE	1(1)	1(10)	7(11)	5(5)	(14, 27)
TEMECULA	1(0)	1(8)	7(6)	5(4)	(14, 18)
BANNING PASS	1(0)	1(7)	7(15)	5(2)	(14, 24)
SAN DIEGO COUNTY.....					
OCEANSIDE	0(3)	1(18)	4(13)	2(1)	(7, 35)
MOUNT PALOMAR	0(0)	1(9)	4(28)	2(8)	(7, 45)
SAN DIEGO LINDBERGH FLD	0(1)	1(6)	4(15)	2(1)	(7, 23)
EL CAPITAN DAM	0(0)	1(5)	4(13)	2(2)	(7, 20)

THOMPSON OBJECTIVE RAINFALL SYSTEM FOR LOS ANGELES INTERNATIONAL AIRPORT
 PERCENT PROBABILITY FOR THE DIFFERENT AMOUNTS OF RAINFALL LISTED BELOW:

ZERO .01-.15 .16-.49 .50-1.50 >1.50
 MM MM MM MM MM

SYNOPSIS: A LARGE STORM SYSTEM IS BEARING DOWN ON SOUTHERN CALIFORNIA. THE
 LEADING EDGE OF THE STORM WILL SPREAD RAIN OVER THE SOUTHLAND BY NOON. THE
 SYSTEM IS FORECAST TO RAPIDLY INTENSIFY THIS AFTERNOON. THIS STORM HAS
 POTENTIAL FOR 2-5 INCHES OF RAIN. THE STORM WILL TAPER OFF BY EARLY MORNING
 THURSDAY.

QUANTITATIVE PRECIPITATION FORECAST...CORRECTED
 NATIONAL WEATHER SERVICE OXNARD CA
 545 PM PST TUE JAN 4 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	6 (3)	1 (2)	0 (0)	0 (0)	(7,5)
SANTA BARBARA	8 (10)	2 (0)	0 (0)	0 (0)	(10,10)
GIBRALTAR DAM	14 (11)	4 (0)	0 (0)	0 (1)	(18,12)
VENTURA COUNTY.....					
VENTURA	9 (8)	2 (0)	1 (0)	0 (0)	(12,8)
TODD BARRANCA	14 (2)	4 (0)	2 (0)	0 (0)	(20,2)
LAKE SHERWOOD	14 (9)	4 (0)	2 (0)	0 (0)	(20,9)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	14 (11)	4 (0)	3 (0)	0 (0)	(21,11)
LOS ANGELES CIVIC CNTR	7 (11)	3 (1)	2 (0)	0 (0)	(12,12)
MOUNT WILSON	12 (7)	6 (2)	3 (0)	0 (0)	(21,9)
ORANGE COUNTY.....					
SANTA ANA #219	8 (15)	4 (1)	3 (0)	0 (0)	(15,16)
LAGUNA BEACH	8 (13)	4 (0)	3 (0)	0 (0)	(15,13)
SANTIAGO PEAK	12 (13)	6 (9)	3 (2)	0 (0)	(21,24)
RIVERSIDE COUNTY.....					
RIVERSIDE	5 (11)	4 (5)	2 (0)	0 (0)	(11,16)
TEMECULA	5 (6)	4 (4)	2 (0)	0 (0)	(11,10)
BANNING PASS	8 (15)	4 (2)	2 (0)	0 (0)	(14,17)
SAN DIEGO COUNTY.....					
OCEANSIDE	8 (13)	5 (1)	3 (0)	0 (0)	(16,14)
MOUNT PALOMAR	15 (28)	10 (8)	5 (1)	0 (0)	(30,37)
SAN DIEGO LINDBERGH FLD	8 (15)	5 (1)	3 (0)	0 (0)	(16,16)
EL CAPITAN DAM	10 (13)	7 (2)	5 (0)	0 (0)	(22,15)

SYNOPSIS: RAIN BANDS WILL MOVE WEST TO EAST ACROSS THE REGION THIS EVENING
 THROUGH TONIGHT. WITH MOIST WESTERLY FLOW SUPPORTING ADDITIONAL
 ACCUMULATIONS OF 1-3 INCHES.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 200 PM PST FRI JAN 6 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: Verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	4 (0)	5 (7)	3 (0)	1 (0)	(13,7)
SANTA BARBARA	1 (0)	5 (2)	4 (3)	1 (0)	(11,5)
GIBRALTAR DAM	2 (0)	5 (5)	4 (7)	1 (0)	(12,12)
VENTURA COUNTY.....					
VENTURA	0 (0)	1 (1)	5 (5)	2 (1)	(8,7)
TODD BARRANCA	0 (0)	1 (0)	6 (6)	2 (0)	(9,6)
LAKE SHERWOOD	0 (0)	1 (0)	6 (9)	2 (2)	(9,11)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	0 (0)	1 (0)	9 (8)	5 (4)	(15,12)
LOS ANGELES CIVIC CNTR	0 (0)	0 (0)	7 (6)	3 (4)	(10,10)
MOUNT WILSON	0 (0)	1 (0)	9 (5)	9 (10)	(19,15)
ORANGE COUNTY.....					
SANTA ANA #219	0 (0)	0 (0)	6 (6)	4 (8)	(10,14)
LAGUNA BEACH	0 (0)	0 (0)	6 (1)	4 (4)	(10,5)
SANTIAGO PEAK	0 (0)	0 (0)	6 (6)	6 (17)	(12,23)
RIVERSIDE COUNTY.....					
RIVERSIDE	0 (0)	0 (0)	6 (1)	4 (2)	(10,3)
TEMECULA	0 (0)	0 (0)	6 (0)	3 (0)	(9,0)
BANNING PASS	0 (0)	0 (0)	6 (0)	5 (3)	(11,3)
SAN DIEGO COUNTY.....					
OCEANSIDE	0 (0)	0 (0)	3 (1)	3 (2)	(6,3)
MOUNT PALOMAR	0 (0)	0 (0)	5 (0)	7 (0)	(12,0)
SAN DIEGO LINDBERGH FLD	0 (0)	0 (0)	3 (0)	3 (0)	(6,0)
EL CAPITAN DAM	0 (0)	0 (0)	3 (0)	5 (0)	(8,0)

SYNOPSIS: A STORM MOVING TOWARD SOUTHERN CALIFORNIA MAY CAUSE FLASH FLOOD
 PROBLEMS EARLY SATURDAY. A FLASH FLOOD WATCH WILL BE IN EFFECT FOR COASTS
 AND VALLEYS. WHERE ONE OR MAYBE TWO INCHES OF RAIN MAY FALL. A WINTER STORM
 WARNING WILL BE IN EFFECT FOR MOUNTAINS. WHERE 6 TO 12 INCHES OF SNOW MAY
 FALL THROUGH SATURDAY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 AM PST SAT JAN 7 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY.....					
SANTA MARIA	8(0)	4(0)	1(0)	0(0)	(13,0)
SANTA BARBARA	10(3)	5(0)	1(0)	0(0)	(16,3)
GIBRALTAR DAM	10(7)	5(0)	1(0)	0(0)	(16,7)
VENTURA COUNTY.....					
VENTURA	12(5)	5(1)	1(0)	0(0)	(18,6)
TODD BARRANCA	10(6)	6(0)	1(0)	0(0)	(17,6)
LAKE SHERWOOD	10(9)	8(2)	1(0)	0(0)	(19,11)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	4(8)	5(4)	2(0)	0(0)	(11,12)
LOS ANGELES CIVIC CNTR	3(6)	4(4)	1(2)	0(1)	(8,13)
MOUNT WILSON	3(5)	4(10)	1(3)	0(3)	(8,21)
ORANGE COUNTY.....					
SANTA ANA #219	2(6)	4(8)	1(3)	0(1)	(7,18)
LAGUNA BEACH	2(1)	4(4)	1(6)	0(3)	(7,14)
SANTIAGO PEAK	2(6)	4(17)	1(16)	0(13)	(7,52)
RIVERSIDE COUNTY.....					
RIVERSIDE	2(1)	4(2)	2(4)	0(0)	(8,7)
TEMECULA	2(0)	4(0)	2(4)	0(1)	(8,5)
BANNING PASS	2(0)	4(3)	2(7)	0(1)	(8,11)
SAN DIEGO COUNTY.....					
OCEANSIDE	1(1)	5(2)	2(8)	0(3)	(8,14)
MOUNT PALOMAR	1(0)	7(0)	3(2)	0(3)	(11,5)
SAN DIEGO LINDBERGH FLD	1(0)	5(0)	1(1)	0(2)	(7,3)
EL CAPITAN DAM	1(0)	5(0)	1(1)	0(5)	(7,6)

SYNOPSIS: UPPER LOW OFF THE NORTHERN CALIFORNIA COAST PRODUCING WIDE BAND OF
 SHOWERS AND A FEW THUNDERSTORMS ACROSS PORTIONS OF SOUTHERN CALIFORNIA TODAY.
 RAIN ENDING THIS EVENING. ANOTHER WEAKER SYSTEM MAY BRUSH NORTHERN SECTIONS
 OF THE SOUTHLAND SUNDAY NIGHT AND MONDAY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 200 PM PST SAT JAN 7 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	1(0)	2(0)	0(0)	1(0)	(4,0)
SANTA BARBARA	1(0)	1(0)	0(1)	0(19)	(2,20)
GIBRAL TAR DAM	1(0)	2(0)	0(1)	1(15)	(4,16)
VENTURA COUNTY.....					
VENTURA	0(0)	1(0)	1(0)	1(2)	(3,2)
TODD BARRANCA	0(0)	1(0)	1(0)	1(2)	(3,2)
LAKE SHERWOOD	0(0)	1(0)	1(1)	1(4)	(3,5)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	0(0)	1(0)	1(1)	1(2)	(3,3)
LOS ANGELES CIVIC CNTR	0(2)	0(1)	1(1)	1(4)	(2,8)
MOUNT WILSON	0(3)	1(3)	2(3)	1(11)	(4,20)
ORANGE COUNTY.....					
SANTA ANA #219	0(3)	1(1)	1(0)	1(1)	(3,5)
LAGUNA BEACH	0(6)	1(3)	1(2)	1(0)	(3,11)
SANTIAGO PEAK	0(16)	1(13)	1(14)	1(12)	(3,55)
RIVERSIDE COUNTY.....					
RIVERSIDE	1(4)	1(0)	1(0)	1(1)	(4,5)
TEMECULA	1(4)	1(1)	1(0)	1(1)	(4,6)
BANNING PASS	1(7)	1(1)	1(1)	1(0)	(4,9)
SAN DIEGO COUNTY.....					
OCEANSIDE	2(8)	1(3)	1(3)	1(0)	(5,14)
MOUNT PALOMAR	3(2)	2(3)	1(2)	1(0)	(7,7)
SAN DIEGO LINDBERGH FLD	2(1)	1(2)	1(0)	1(0)	(5,3)
EL CAPITAN DAM	3(1)	2(5)	1(0)	1(0)	(7,6)

SYNOPSIS: A STORM MOVING ACROSS CENTRAL CALIFORNIA HAS CAUSED ABOUT AN INCH
 OF RAIN ALONG THE COAST. WITH 1 OR 2 INCHES POSSIBLY IN THE FOOTHILLS. A
 MOIST FLOW FROM PACIFIC OCEAN WILL CAUSE MORE SHOWERS TONIGHT. A WINTER
 WEATHER ADVISORY WILL BE IN EFFECT FOR MOUNTAINS, WHERE SEVERAL MORE INCHES
 OF SNOW MAY FALL THROUGH SUNDAY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 AM PST SUN JAN 8 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY.....					
SANTA MARIA	0(0)	1(0)	1(0)	1(0)	(3,0)
SANTA BARBARA	1(1)	1(19)	0(2)	0(7)	(2,29)
GIBRAL TAR DAM	1(1)	2(15)	0(6)	0(4)	(3,26)
VENTURA COUNTY.....					
VENTURA	1(0)	1(2)	0(3)	0(1)	(2,5)
TODD BARRANCA	1(0)	1(2)	0(9)	0(2)	(2,13)
LAKE SHERWOOD	1(1)	1(4)	0(15)	0(5)	(2,25)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	1(1)	1(2)	0(5)	0(1)	(2,9)
LOS ANGELES CIVIC CNTR	1(1)	1(4)	0(1)	0(1)	(2,7)
MOUNT WILSON	2(3)	2(11)	1(15)	0(9)	(5,38)
ORANGE COUNTY.....					
SANTA ANA #219	1(0)	1(1)	0(0)	0(0)	(2,1)
LAGUNA BEACH	1(2)	1(0)	0(0)	0(0)	(2,2)
SANTIAGO PEAK	2(14)	2(12)	1(7)	0(3)	(5,36)
RIVERSIDE COUNTY.....					
RIVERSIDE	1(0)	1(1)	0(0)	0(0)	(2,1)
TEMECULA	1(0)	1(1)	0(0)	0(0)	(2,1)
BANNING PASS	1(1)	1(0)	0(0)	0(0)	(2,1)
SAN DIEGO COUNTY.....					
OCEANSIDE	1(3)	1(0)	0(1)	0(0)	(2,4)
MOUNT PALOMAR	2(2)	2(0)	1(0)	0(0)	(5,2)
SAN DIEGO LINDBERGH FLD	1(0)	0(0)	0(0)	0(0)	(1,0)
EL CAPITAN DAM	2(0)	2(0)	1(0)	0(0)	(5,0)

SYNOPSIS: A MOIST SOUTHWEST FLOW WILL CONTINUE AREAS OF LIGHT RAIN IN
 SOUTHERN CALIFORNIA TODAY WITH THE HEAVIER RAIN IN THE MOUNTAINS. THE SNOW
 LEVEL IS 7000 TO 8000 FT. THERE IS STILL A SLIGHT CHANCE OF SHOWERS TONIGHT.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 200 PM PST SUN JAN 8 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	0(0)	1(0)	1(1)	2(1)	(4,2)
SANTA BARBARA	1(2)	0(7)	0(5)	1(2)	(2,16)
GIBRALTAR DAM	1(6)	1(4)	1(12)	1(9)	(4,31)
VENTURA COUNTY.....					
VENTURA	1(3)	0(1)	0(2)	1(2)	(2,8)
TODD BARRANCA	1(9)	0(2)	0(0)	1(0)	(2,11)
LAKE SHERWOOD	1(15)	0(5)	0(11)	1(0)	(2,31)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	1(5)	0(1)	0(4)	1(0)	(2,10)
LOS ANGELES CIVIC CNTR	1(1)	0(1)	0(0)	1(0)	(2,2)
MOUNT WILSON	2(15)	1(9)	1(2)	2(1)	(6,27)
ORANGE COUNTY.....					
SANTA ANA #219	1(0)	0(0)	0(0)	1(0)	(2,0)
LAGUNA BEACH	1(0)	0(0)	0(0)	1(0)	(2,0)
SANTIAGO PEAK	1(7)	0(3)	0(0)	1(0)	(2,10)
RIVERSIDE COUNTY.....					
RIVERSIDE	1(0)	1(0)	1(0)	1(0)	(4,0)
TEMECULA	1(0)	1(0)	1(0)	1(0)	(4,0)
BANNING PASS	1(0)	1(0)	1(0)	1(0)	(4,0)
SAN DIEGO COUNTY.....					
OCEANSIDE	1(1)	0(0)	0(0)	0(0)	(1,1)
MOUNT PALOMAR	2(0)	1(0)	1(1)	1(0)	(5,1)
SAN DIEGO LINDBERGH FLD	0(0)	0(0)	0(0)	1(0)	(1,0)
EL CAPITAN DAM	1(0)	1(0)	1(0)	1(0)	(4,0)

SYNOPSIS: MOIST FLOW ACROSS THE DISTRICT WILL CAUSE RAIN AND DRIZZLE. WITH
 UP TO AN INCH RAINFALL ON MOUNTAINS THROUGH MONDAY. AN APPROACHING STORM
 SYSTEM MAY CAUSE WIDESPREAD HEAVY RAIN MONDAY NIGHT AND TUESDAY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 AM PST MON JAN 9 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: Verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY.....					
SANTA MARIA	2(1)	5(1)	6(0)	10(14)	(13,16)
SANTA BARBARA	1(5)	2(2)	6(0)	10(28)	(19,35)
GIBRALTAR DAM	4(12)	6(9)	10(7)	15(34)	(35,62)
VENTURA COUNTY.....					
VENTURA	1(2)	2(2)	4(0)	10(10)	(17,14)
TODD BARRANCA	3(0)	4(0)	7(0)	12(0)	(26,0)
LAKE SHERWOOD	2(11)	3(0)	6(1)	10(4)	(21,16)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	3(4)	4(0)	7(0)	12(0)	(26,4)
LOS ANGELES CIVIC CNTR	1(0)	1(0)	3(0)	8(0)	(13,0)
MOUNT WILSON	9(2)	10(1)	14(0)	18(6)	(51,9)
ORANGE COUNTY.....					
SANTA ANA #219	0(0)	1(0)	2(0)	5(0)	(8,0)
LAGUNA BEACH	0(0)	0(0)	2(0)	4(0)	(6,0)
SANTIAGO PEAK	3(0)	4(0)	6(1)	8(3)	(21,4)
RIVERSIDE COUNTY.....					
RIVERSIDE	0(0)	1(0)	2(0)	5(1)	(8,1)
TEMECULA	0(0)	0(0)	2(0)	5(0)	(7,0)
BANNING PASS	0(0)	1(0)	2(0)	6(0)	(9,0)
SAN DIEGO COUNTY.....					
OCEANSIDE	0(0)	0(0)	1(0)	3(0)	(4,0)
MOUNT PALOMAR	0(1)	1(0)	2(0)	5(0)	(8,1)
SAN DIEGO LINDBERGH FLD	0(0)	0(0)	1(0)	3(0)	(4,0)
EL CAPITAN DAM	0(0)	1(0)	1(0)	4(0)	(6,0)

SYNOPSIS: A MOIST FLOW ACROSS THE SOUTHLAND WILL CAUSE RAIN AND DRIZZLE IN
 THE COASTAL AREAS WITH HEAVIER RAIN IN THE MOUNTAINS DUE TO THE OROGRAPHIC
 EFFECT. A STRONG COLD FRONT WILL MOVE INTO SOUTHERN CALIFORNIA LATE TONIGHT
 AND TUESDAY BRINGING WIDESPREAD MODERATE TO HEAVY RAIN.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 200 PM PST MON JAN 9 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: Verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	2(0)	7(14)	8(3)	1(1)	(18,18)
SANTA BARBARA	1(0)	7(28)	7(39)	1(8)	(16,75)
GIBRALTAR DAM	1(7)	7(34)	9(35)	3(10)	(20,86)
VENTURA COUNTY.....					
VENTURA	1(0)	5(10)	7(31)	2(9)	(15,50)
TODD BARRANCA	1(0)	5(0)	7(24)	1(4)	(14,28)
LAKE SHERWOOD	1(1)	5(4)	8(30)	1(17)	(15,52)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	1(0)	7(0)	9(22)	3(17)	(20,39)
LOS ANGELES CIVIC CNTR	1(0)	5(0)	5(12)	3(18)	(14,30)
MOUNT WILSON	1(0)	7(6)	15(25)	5(22)	(28,53)
ORANGE COUNTY.....					
SANTA ANA #219	0(0)	3(0)	6(3)	3(20)	(12,23)
LAGUNA BEACH	0(0)	3(0)	6(2)	4(21)	(13,23)
SANTIAGO PEAK	1(1)	3(3)	8(4)	5(19)	(17,27)
RIVERSIDE COUNTY.....					
RIVERSIDE	0(0)	1(1)	9(5)	5(8)	(15,14)
TEMECULA	0(0)	1(0)	10(2)	6(4)	(17,6)
BANNING PASS	0(0)	1(0)	10(1)	6(16)	(17,17)
SAN DIEGO COUNTY.....					
OCEANSIDE	0(0)	0(0)	3(1)	5(18)	(8,19)
MOUNT PALOMAR	0(0)	1(0)	5(0)	8(6)	(14,6)
SAN DIEGO LINDBERGH FLD	0(0)	0(0)	2(0)	5(0)	(7,0)
EL CAPITAN DAM	0(0)	1(0)	5(0)	7(0)	(13,0)

SYNOPSIS: SUPER-SATURATED CONDITIONS. WITH INCREASING DYNAMICS ALOFT AND A
 SLIGHT PUSH EAST OF THE MAIN TROUGH, WILL BRING MODERATE TO HEAVY RAIN TO THE
 SOUTHLAND TONIGHT AND TUESDAY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 AM PST TUE JAN 10 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: Verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY.....					
SANTA MARIA	5(3)	4(1)2	2(2)	1(5)	(12,11)
SANTA BARBARA	20(39)	10(8)	3(5)	1(1)	(34,53)
GIBRALTAR DAM	28(35)	12(10)	4(5)	2(5)	(46,55)
VENTURA COUNTY.....					
VENTURA	20(31)	12(9)	6(4)	1(1)	(39,45)
TODD BARRANCA	24(24)	14(4)	7(1)	1(0)	(46,29)
LAKE SHERWOOD	24(30)	14(17)	7(4)	1(6)	(46,57)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	20(22)	14(17)	7(2)	1(1)	(42,42)
LOS ANGELES CIVIC CNTR	6(12)	15(18)	5(3)	2(2)	(28,35)
MOUNT WILSON	20(25)	30(22)	10(4)	4(12)	(64,63)
ORANGE COUNTY.....					
SANTA ANA #219	1(3)	8(20)	8(2)	2(0)	(19,25)
LAGUNA BEACH	1(2)	7(21)	7(5)	3(0)	(18,28)
SANTIAGO PEAK	4(4)	15(19)	15(11)	6(13)	(40,47)
RIVERSIDE COUNTY.....					
RIVERSIDE	1(5)	5(8)	10(6)	2(0)	(18,19)
TEMECULA	1(2)	4(4)	9(4)	2(1)	(16,11)
BANNING PASS	1(1)	5(16)	12(7)	3(1)	(21,25)
SAN DIEGO COUNTY.....					
OCEANSIDE	0(1)	2(18)	6(5)	3(0)	(11,23)
MOUNT PALOMAR	1(0)	5(6)	12(15)	5(4)	(23,25)
SAN DIEGO LINDBERGH FLD	0(0)	1(0)	6(6)	3(0)	(10,6)
EL CAPITAN DAM	0(0)	2(0)	10(6)	5(1)	(17,7)

SYNOPSIS: A VERY WET STRONG COLD FRONT WILL MOVE THROUGH SOUTHERN CALIFORNIA
 TODAY. RAIN WILL DECREASE TONIGHT BEHIND THE FRONT. THERE WILL BE ANOTHER
 CHANCE OF RAIN BY WEDNESDAY AFTERNOON.

QUANTITATIVE PRECIPITATION FORECAST....UPDATE
 NATIONAL WEATHER SERVICE OXNARD CA
 200 PM PST TUE JAN 10 1995

NOTE: THE FIRST PERIOD INCLUDES 8 HOUR TOTALS, INCLUDING THE 2PM-4PM HOURS.

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. NOTE: Verification in ()

	*16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY....					
SANTA MARIA	22(2)	5(5)	1(0)	1(0)	(29,7)
SANTA BARBARA	23(5)	6(1)	1(8)	1(0)	(31,14)
GIBRALTAR DAM	26(5)	6(5)	2(1)	2(0)	(35,11)
VENTURA COUNTY....					
VENTURA	23(4)	4(1)	3(0)	1(0)	(31,5)
TODD BARRANCA	23(1)	3(0)	3(0)	2(0)	(31,1)
LAKE SHERWOOD	28(4)	4(6)	3(3)	2(0)	(37,9)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	28(2)	5(1)	3(4)	2(0)	(38,7)
LOS ANGELES CIVIC CNTR	25(3)	7(2)	3(1)	1(0)	(36,6)
MOUNT WILSON	32(4)	12(12)	4(16)	2(3)	(50,35)
ORANGE COUNTY.....					
SANTA ANA #219	25(2)	8(0)	4(0)	1(0)	(38,2)
LAGUNA BEACH	28(5)	8(0)	4(0)	2(0)	(42,5)
SANTIAGO PEAK	35(11)	15(13)	7(9)	2(4)	(59,37)
RIVERSIDE COUNTY....					
RIVERSIDE	18(6)	9(0)	4(0)	1(0)	(32,6)
TEMECULA	18(4)	8(1)	4(0)	1(3)	(31,8)
BANNING PASS	20(7)	10(1)	3(1)	2(1)	(35,10)
SAN DIEGO COUNTY....					
OCEANSIDE	9(5)	12(0)	7(0)	1(0)	(29,5)
MOUNT PALOMAR	12(15)	12(4)	7(2)	2(4)	(33,25)
SAN DIEGO LINDBERGH FLD	6(6)	8(0)	6(0)	1(2)	(21,8)
EL CAPITAN DAM	7(6)	12(1)	8(0)	1(2)	(28,9)

SYNOPSIS: RAIN CONTINUES MODERATE TO HEAVY ALONG FRONTAL BAND TEHACHAPIS-
 OXNARD-SANTA CRUZ ISLAND. FRONT TO PUSH EAST AND SOUTH EVENING HOURS. WITH
 POST-FRONTAL SHOWERS OVERNIGHT NORTH AND WEST PRODUCING ADDITIONAL
 PRECIPITATION IN THE ONE INCH CATEGORY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 PM PST WED JAN 11 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	16-22	22-04	04-10	10-16	
SANTA BARBARA COUNTY.....					
SANTA MARIA	2 (1)	0 (1)	0 (0)	0 (0)	(2,2)
SANTA BARBARA	1 (0)	0 (0)	0 (1)	0 (0)	(1,1)
GIBRALTAR DAM	2 (0)	0 (0)	0 (4)	0 (0)	(2,4)
VENTURA COUNTY.....					
VENTURA	1 (0)	0 (4)	0 (2)	0 (0)	(1,6)
TODD BARRANCA	1 (0)	0 (2)	0 (2)	0 (0)	(1,4)
LAKE SHERWOOD	0 (0)	0 (3)	0 (2)	0 (0)	(0,5)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	1 (0)	0 (3)	0 (3)	0 (0)	(1,6)
LOS ANGELES CIVIC CTR	0 (0)	0 (1)	0 (2)	0 (0)	(0,3)
MOUNT WILSON	2 (0)	0 (2)	0 (4)	0 (0)	(2,6)
ORANGE COUNTY.....					
SANTA ANA #219	0 (0)	0 (0)	0 (3)	0 (0)	(0,3)
LAGUNA BEACH	0 (0)	0 (0)	0 (1)	0 (0)	(0,1)
SANTIAGO PEAK	1 (0)	0 (2)	0 (9)	0 (0)	(1,11)
RIVERSIDE COUNTY.....					
RIVERSIDE	0 (0)	0 (0)	0 (3)	0 (0)	(0,3)
TEMECULA	0 (0)	0 (0)	0 (2)	0 (0)	(0,2)
BANNING PASS	0 (0)	0 (0)	0 (2)	0 (1)	(0,3)
SAN DIEGO COUNTY.....					
OCEANSIDE	0 (0)	0 (0)	0 (2)	0 (1)	(0,3)
MOUNT PALOMAR	0 (0)	0 (0)	0 (3)	0 (2)	(0,5)
SAN DIEGO LINDBERGH FLD	0 (0)	0 (0)	0 (3)	0 (3)	(0,6)
EL CAPITAN DAM	0 (0)	0 (0)	0 (3)	0 (2)	(0,5)

SYNOPSIS: A TROPICAL FLOW OF MOISTURE WILL CAUSE SCATTERED SHOWERS TODAY,
 SOME RAIN MAY BE HEAVY AT TIMES THIS AFTERNOON. A WEAK RIDGE OF HIGH
 PRESSURE WILL CAUSE MOSTLY DRY WEATHER TONIGHT AND THURSDAY.

QUANTITATIVE PRECIPITATION FORECAST
 NATIONAL WEATHER SERVICE OXNARD CA
 400 AM PST WED JAN 11 1995

PRECIPITATION FORECAST IN TENTHS OF AN INCH FOR THE NEXT 24 HRS GIVEN IN 6
 HOUR INCREMENTS FOR THE FOLLOWING LOCATIONS. Note: verification in ()

	04-10	10-16	16-22	22-04	
SANTA BARBARA COUNTY.....					
SANTA MARIA	5(0)	6(0)	2(1)	1(1)	(14,2)
SANTA BARBARA	4(8)	5(0)	2(0)	0(0)	(11,8)
GIBRALTAR DAM	6(1)	6(0)	5(0)	1(0)	(18,1)
VENTURA COUNTY.....					
VENTURA	2(0)	6(0)	3(0)	0(0)	(11,0)
TODD BARRANCA	3(0)	7(0)	3(0)	0(0)	(13,0)
LAKE SHERWOOD	3(3)	7(0)	3(0)	0(3)	(13,6)
LOS ANGELES COUNTY.....					
BIG ROCK MESA	3(4)	5(0)	4(0)	0(3)	(12,7)
LOS ANGELES CIVIC CNTR	3(1)	5(0)	3(0)	0(1)	(11,2)
MOUNT WILSON	5(16)	9(3)	5(0)	1(2)	(20,21)
ORANGE COUNTY.....					
SANTA ANA #219	2(0)	3(0)	3(0)	0(0)	(8,0)
LAGUNA BEACH	2(0)	3(0)	2(0)	0(0)	(7,0)
SANTIAGO PEAK	5(9)	5(4)	3(0)	0(2)	(13,15)
RIVERSIDE COUNTY.....					
RIVERSIDE	4(0)	4(0)	3(0)	0(0)	(11,0)
TEMECULA	2(0)	3(3)	2(0)	0(0)	(7,3)
BANNING PASS	3(1)	3(1)	3(0)	0(0)	(9,2)
SAN DIEGO COUNTY.....					
OCEANSIDE	1(0)	1(0)	1(0)	0(0)	(3,0)
MOUNT PALOMAR	3(2)	5(4)	2(0)	0(0)	(10,6)
SAN DIEGO LINDBERGH FLD	1(0)	1(2)	1(0)	0(0)	(3,2)
EL CAPITAN DAM	2(0)	3(2)	2(0)	0(0)	(7,2)

SYNOPSIS: A TROPICAL FLOW OF MOISTURE WILL CAUSE SCATTERED SHOWERS TODAY,
 SOME RAIN MAY BE HEAVY AT TIMES THIS AFTERNOON. A WEAK RIDGE OF HIGH
 PRESSURE WILL CAUSE MOSTLY DRY WEATHER TONIGHT AND THURSDAY.

Appendix C- List of Applicable Bulletins and Statements from NWSFO Los Angeles and WSO Santa Maria

MONDAY, JANUARY 2, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
4:15 pm	MWS/LAX	...Moderate Surf Oxnard, Ventura Coastline...
11:15 pm	SPS/LAX	... Rain, Locally Heavy, with Snow in Mountains Southern Calif on Tuesday... One inch valleys, 2-3 inches in mountains expected from major winter storm.

TUESDAY, JANUARY 3, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
Midnight	MWS/LAX	...Moderate Surf Oxnard, Ventura Today...
2:00 am	SPS/LAX	...Rain Has Started to Fall Across Southland... Santa Barbara noted .87 so far. One inch rain forecast for coasts to 2-3" mountains.
3:25 am	FFW/LAX	...Flash Flood Watch with Possible Mud and Debris Flow Topanga/Malibu, Laguna and Altadena Burn Areas til 11 pm... Ojai 88D indicates areas of heavy rain embedded in areas of widespread precip.
3:40 am	FFA/LAX	...Correction to above to add Western LA County...
4:50 am	MWS/LAX	...Thunderstorms Moving Through Santa Barbara Channel... Activity detected by 88D.
5:25 am	SPS/LAX	...Rain Has Arrived Over Most Coastal Areas... Sudden Peak notes 1.3" today. Most reports between .15 and .50"
6:00 am	WSW/LAX	...Snow Advisory Above 5000 Feet San Bernardino Range Northward... ...Snow Advisory Above 6000 Feet Elsewhere til 3 pm... Snow amounts of 4 to 7" and locally higher expected.
6:50 am	FFA/LAX	Same Headline as 3:25 am...
7:20 am	FFS/LAX	...Urban Small Stream Flood Advisory Coast of Santa Barbara and Ventura Counties til 9:30 am... Few locations such as Santa Barbara have noted 1" to 2" with minor flooding.

8:30 am FFS/LAX ...Urban Small Stream Flood Advisory Extended to Western Portions of LA County til 10:30 am...Ojai 88D indicates moderate to heavy rainfall moving into western LA county from Malibu to Santa Monica.

9:00 am SPS/LAX ...Same Headline as 3:25 am...
...Potent Storm System Continued to Move East Across Southern California This Morning...Potent storm moving across area. Portions of Santa Barbara County have received between 1"-2" this morning.

9:30 am WSW/LAX ...Winter Storm Warning for Mountains Above 4000 Feet San Bernardino Range Northward Except Santa Barbara Mountains til 3 pm...
...Winter Storm Warning for Mountains Above 5000 Feet South of San Bernardino Range til 3 pm...
...Snow Advisory for Owens Valley til 3 pm... I-5 over Grapevine has been closed due to snow and high winds. Six to 10" snow expected above 4000'.

9:35 am FFS/LAX ...Urban Small Stream Flood Advisory Expanded to All Los Angeles County and Orange Counties til noon...
...Urban Small Stream Flood Advisory Coast of Santa Barbara and Ventura Counties expired at 9:30 am...

10:05 am FFS/LAX ...Same Headline as 3:25 am... Malibu/Old Topanga noted 0.79" rain this morning.

11:00 am FFS/LAX ...Same Headline as 9:35 am...

11:35 am WSW/LAX ...Same Headline as 9:30 am...
...Snow Advisory Added for Antelope Valley Above 2500' til 3 pm...

noon FFS/LAX ...Urban Small Stream Flood Advisory for Los Angeles and Orange County Expired at Noon...Rain has decreased.

noon SPS/LAX ...Same Headline as 9:30 am...
...Same Headline as 3:25 am...
...Powerful Storm System Continues to Move Eastward Across Southern California...Six to 8" new snow reported in Tehachapi mountains. Burn areas have received 1/3" to 2/3".

1:15 pm MWS/LAX ...Local Moderate Surf Srn California Coastline...

1:25 pm FFS/LAX ...Same Headline as 3:25 am... Rain has let up, but more expected this evening.

3:00 pm SPS/LAX ...Snow Advisory Owens Valley Expired at 3:00 pm...

3:05 pm WSW/LAX ...Winter Storm Warning above 3000 Feet from the San

Bernardino Range Northward, Elsewhere Above 4000 Feet Tonight... Second in series of storms will result in another 6-12" snow later tonight and early Wednesday.

4:12 pm SPS/LAX ...Same Headline as 3:05 pm...
...Same Headline as 3:25 am... Another 1/2" to 1" rain expected coastal sections and valleys and 6" to 12" snow in mountains.

4:15 pm FFS/LAX ...Same Headline as 3:25 am...Rain will increase after sunset.

6:20 pm WSW/LAX ...Same Headline as 3:05 pm... VBG 88D indicates precipitation to begin at about 7 pm coast of Santa Barbara County.

8:10 pm WSW/LAX ...Same Headline as 3:05 pm...Heavy snow expected with a second storm to move into area late tonight and may extend through Wednesday.

9:00 pm FFS/LAX ...Flash Flood Watch Canceled for Topanga/Malibu, Laguna, and Altadena Burn Areas... Rain has let up for now, but heavy rain is in the forecast for Wednesday and Wednesday night and a Flash Flood Watch may be issued later.

9:00 pm WSW/LAX ...Winter Storm Warning Canceled for Tonight for the San Bernardino Range Northward Above 3000 Feet and Elsewhere Above 4000 Feet ...
...Winter Storm Watch Issued for Same Area of Southern California Mountains Wednesday and Wednesday Night...It now appears that next storm system will be delayed until Wednesday morning which may produce 6" to 10" snow.

WEDNESDAY, JANUARY 4, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
1:40 am	MWS/LAX	...Moderate Surf Persists Along Srn California Coastline Today...
3:25 am	FFA/LAX	...Flash Flood Watch In Effect For Santa Barbara, Ventura, and Los Angeles Counties this Afternoon and Tonight... ...Flash Flood Watch with Possible Debris Flow for the Topanga/Malibu, Laguna, and Altadena Burn Areas this Afternoon and Tonight... Rainfall, by late tonight could total from 3" to 5". Rainfall in the burn areas could exceed 1 to 2".

3:25 am WSW/LAX ...Winter Storm Watch Now in Effect Above 3000 Feet from the San Bernardino Range Northward, Elsewhere Above 4000 Feet Through Tonight...Snow amounts of 6" to 12" expected.

5:05 am FFS/LAX ...Urban Small Stream Flood Advisory for Santa Barbara and Ventura Counties in Effect Until 4 pm Today... VBG and Ojai 88Ds showing rainfall over area, with embedded heavy showers. Local street flooding occurring in Oxnard.

5:40 am SPS/LAX ...Same Headline as 5:05 am...
...Same Headline as 3:25 am (FFA)...
...Same Headline as 3:25 am (WSW)...Vigorous cold front to bring heavy rain this afternoon. Rainfall amounts of 1"-3" coast and 3" - 5" foothills and mountains expected.

8:50 am WSW/LAX ...Winter Storm Warning Above 5000 Feet Today from the San Bernardino Range Northward and 4000 Feet Tonight...
...Winter Storm Warning for Other Mountain Ranges Above 6000 Feet Today and 5000 Feet Tonight... One to two feet of snow expected with 35 to 45 mph winds and gusts to 60 mph.

9:00 am FFA/LAX ...Same Headline as 3:25 am... Rainfall totals of 1" to 3" coastal sections and 3" to 5" on the foothills and lower mountain elevations expected.

9:30 am NPW/SMX ...Wind Advisory Santa Barbara County Until 6 pm Tonight...

9:20 am FFA/LAX ...Flash Flood Watch In Effect For Santa Barbara, Ventura, Orange, and Los Angeles Counties Through Tonight...
...Flash Flood Watch with Possible Debris Flow for the Topanga/Malibu, Laguna, and Altadena Burn Areas this Afternoon and Tonight...Brunt of heavy rain will move over area this afternoon.

9:30 am FFS/LAX ...Urban Small Stream Flood Advisory Remains in Effect for Santa Barbara, Ventura, Los Angeles, and Orange Counties in Effect Until 8 pm Today... [Advisory new for Los Angeles and Orange Counties and product extended from 4 to 8 pm]. From 1/3 to 2/3" rain last couple hours.

10:30 am MWS/LAX ...Same Headline as 1:40 am...
...Thunderstorms and Possible WaterSpouts over Coastal Waters...

10:38 am SPS/LAX ...Same Headline as 8:50 am...

...Same Headline as 9:30 am...
...Flash Flood Watch in Effect for Santa Barbara, Ventura, Los Angeles, and Orange Counties Through Tonight Including Topanga/Malibu, Laguna, and Altadena Burn Areas... Rainfall from 1/2" to 1-1/2" this morning, especially Santa Barbara and Ventura Counties.

11:05 am FFS/LAX ...Flash Flood WARNING with Possible Mud and Debris Flow for the Old Topanga Burn Area Until 1 pm...
...Urban Small Stream Flood Advisory Remains in Effect for Santa Barbara, Ventura, Los Angeles, and Orange Counties in Effect Until 8 pm Tonight...
...Flash Flood Watch in Effect for Santa Barbara, Ventura, Los Angeles, and Orange Counties Through Tonight Including Malibu, Laguna, and Altadena Burn Areas... Ojai 88D indicates moderate to heavy rain over warning area with showers developing upstream. Minor mudflow noted with additional heavy rain expected to cause worsening conditions.

11:25 am FFW/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Altadena Burn Area Until 3 pm this Afternoon... Spotter reports .7" since 7 am with street flooding. Ojai 88D notes moderate to heavy rainfall upstream of area.

11:30 am SPS/SMX ...Urban Small Stream Flood Advisory Remains in Effect for Santa Barbara Until 8 pm Tonight...
...Flash Flood Watch Remains Posted for the Santa Barbara and San Luis Obispo Counties through Tonight...
...Wind Advisory Remains Posted for Santa Barbara and San Luis Obispo Counties til 8 pm... Rainfall of 1" to 2" has fallen in area. High winds to 54 mph have occurred at SMX airport.

11:40 am WSW/LAX ...Snow Advisory for Owens Valley Through 9 pm...

11:50 am WSW/LAX ...Same Headline as 8:50 am...
...Same Headline as 11:40 am... Winds to 60 mph will accompany heavy snow.

12:50 pm FFW/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Malibu/Old Topanga Burn Area Extended Until 3 pm...
...Same Headline as 11:25 am... Rainfall of 1" noted in warning areas with Ojai 88D indicating moderate to heavy rain upstream.

1:15 pm MWS/LAX ...Same Headline as 1:40 am...
...Line of Thunderstorms over Coastal Waters...

1:25 pm SPS/LAX ...Line of Strong Thunderstorms Approaching Ventura and

Los Angeles Counties Coastline... Ojai 88D indicates thundershowers with heavy downpours, gusty winds and lightning approaching area.

1:30 pm WSW/LAX ...Same Headline as 8:50 am...
...Winter Storm Warning for Owens Valley Through This Evening... Heavy snow and high winds expected to continue.

1:30 pm SPS/SMX ...Same Headline as 11:30 am...

1:45 pm WSW/LAX ...Same Headline as 8:50 am...

1:55 pm SPS/LAX ...Road Closure Around Sepulveda Basin... COE has closed roads around Sepulveda Basin. Another 1" to 2" rain expected in area could cause overflow into nearby roads.

2:00 pm MWS/LAX ...Moderate Surf Now Pounding Southern California Beaches Will Increase Thursday...

2:30 pm NPW/SMX ...Cancel Wind Advisory for Santa Barbara County...

2:40 pm FFW/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Malibu/Old Topanga and Altadena Burn Areas Extended Until 6 pm... Rainfall reports of 2.32" since 9 am reported at Malibu with 1/2" since 1:30 pm. Altadena has received 1.5". No major mudflow noted but Ojai 88D notes more heavy rain on the way.

3:00 pm WSW/LAX ...Winter Storm Warning for the Southern California Mountains Above 2000 to 3000 Feet San Bernardino Range Northward Through Tonight.
...Winter Storm Warning for Other Mountains Above 5000 Feet Through Tonight...
...Winter Storm Warning for Owens Valley, Antelope Valley, and Mojave Desert Until 9 pm This Evening...Southern Sierra Nevada will receive 1" to 2'.

3:09 pm FFA/LAX ...Flash Flood Watch Has Been Posted for the Santa Barbara, Western Riverside, and Santa Bernardino Counties, and All of Ventura, Los Angeles, and Orange Counties Through Tonight...
...Same Headline as 3:25 am...Rainfall totals by late tonight will likely total 2" to 5" with another 1" of rain likely on the burn areas.

3:40 pm SPS/LAX ...Line of Thunderstorms was Approaching the Los Angeles Basin... Ojai 88D shows heavy showers approaching area. Severe flooding has occurred on Torrance Boulevard and other areas near the LA airport. Additional rain will worsen problem.

3:50 pm FFS/LAX ...Same Headline as 2:40 pm...
 ...Urban Small Stream Flood Advisory Remains in Effect for Southern Santa Barbara, Ventura, Los Angeles, and Orange Counties Until 8 pm Tonight...
 ...Urban Small Stream Flood Advisory Has Been Posted for Western Riverside and San Bernardino Counties Until 8 pm...
 ...Flash Flood Watch Remains Posted for the Southern Santa Barbara, Western Riverside, and Santa Bernardino Counties, and All of Ventura, Los Angeles, and Orange Counties Including the Malibu, Laguna, and Altadena Burn Areas Through Tonight...
 ...Urban Small Stream Advisory and Flash Flood Watch for Northern Santa Barbara County Canceled... Rainfall amounts to 3/4" to 1" widespread. Gauge near Torrance noted 2.03" between noon and 3 pm.

5:00 pm FFW/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Laguna Burn Area Until 9 pm Tonight...
 ... Extend Flash Flood Warnings for Old Topanga and Kinneloa Burn Areas Until 9 pm Tonight... Laguna area has received 1 1/2" rain since 3 pm with Ojai 88D showing two more rainbands upstream. In Malibu northbound PCH down to one lane due to water and debris. Las Flores Canyon closed.

5:10 pm WSW/LAX ...Winter Storm Warning for the Southern California Mountains Above 2500 Feet San Bernardino Range Northward Through Tonight.
 ...Winter Storm Warning for Other Mountains Above 4000 Feet Through Tonight...
 ...Winter Storm Warning for Owens Valley, Antelope Valley, and Mojave Desert Until 9 pm This Evening... Snowfall of 9" Big Bear noted.

5:30 pm SPS/SMX ...Flash Flood Watch Remains Posted for Southern Santa Barbara County... Today's storm totals include 3.39" Gilbalter Dam.

6:30 pm FFS/LAX ...Same Headline as 5:00 pm...
 ...Flash Flood Watch Remains Through Tonight for the Southern Santa Barbara, Western Riverside, and Santa Bernardino Counties, and All of Ventura, Los Angeles, and Orange Counties...
 ...Urban Small Stream Flood Advisory Remains in Effect for Southern Santa Barbara, Ventura, Los Angeles, Orange, Western Riverside and Western San Bernardino Counties Until 8 pm Tonight... At least two more surges of rain are expected before the early morning hours. Major street flooding is reported in south LA county. City of Carson notes breaching of Dominguez channel with 4' flooding. Street flooding of some degree

widespread throughout Southland. Houses flooded with 3' water in Port Huememe. Rainfall totals between 2" and 4" with Palos Verdes Peninsula reporting 5.75" today.

- 6:40 pm SPS/LAX ...Line of Strong Thunderstorms Moving Through Santa Barbara and Ventura Counties... Ojai 88D indicates activity with locally heavy rain expected as line passes through. San Marco Pass received 1.3" last hour.
- 6:50 pm FFS/LAX ...Update to 6:30 pm Product to Add Coachella Valley in the Urban Small Stream Flood Advisory...
- 7:45 pm WSW/LAX ...Same Headline as 5:10 pm...
...Winter Storm Warning for Owens Valley, Through Tonight...
...Cancel Winter Storm Warning Santa Barbara County Mountains...Lake Arrowhead has reported 16" snow.
- 8:00 pm FFW/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Old Topanga, Kinneloa, and Laguna Burn Area Extended Until Midnight...
...Urban Small Stream Flood Advisory Remains in Effect for Southern Santa Barbara, Ventura, Los Angeles, Orange, Western and Central Riverside and Southwestern San Bernardino Counties Extended Until Midnight...
...Continue Flash Flood Watch Through Tonight for Los Angeles, Orange, Western Riverside, and Southwest San Bernardino Counties Through Tonight...
...Cancel Flash Flood Watch for Southern Santa Barbara and Ventura Counties... 88D indicates heaviest rains are over in Southern Santa Barbara and Ventura Counties, but heavy rains continue further south.
- 8:00 pm SPS/SMX ...Urban Small Stream Flood Advisory Remains for Southern Santa Barbara County Until Midnight... Rainfall past 24 hours was 4.21" Gilbralter Dam, 2.99" Santa Barbara, 2.24" Santa Maria, 4.76" Refugio Pass.
- 8:30 pm MWS/LAX ...Same Headline as 2:00 pm...
- 10:25 pm FFS/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Old Topanga, Kinneloa, and Laguna Burn Area Until Midnight...
...Urban Small Stream Flood Advisory Remains in Effect for Southern Santa Barbara, Ventura, Los Angeles, Orange, Western and Central Riverside and Southwestern San Bernardino Counties Extended Until Midnight...
...Continue Flash Flood Watch Through Tonight for Los Angeles, Orange, Western Riverside, and Western San Bernardino Counties Through Tonight... 88D indicates heavy band showers moving through area, will pass

eastward by midnight. Rain gages indicating 1/2 to 3/4" rainfall per hour with showers. Debris Basins overflowing into Pacific in Malibu area.

10:54 pm LSR/LAX ...Potent Winter Storm Today Produced Strong Winds Both Ahead and Behind the Surface Front... Summary of wind reports with peak gusts to 40-50 kts common in Southland.

10:53 pm LSR/LAX ...Potent Winter Storm over Southland Mountains Today... Snow amounts ranged from 16" Lake Arrowhead to 41/2" Idylwild.

11:43 pm LSR/LAX ...Potent Winter Storm Produced Variety of Weather Across Southland...Summary of flooding. Minor flooding common in every coastal city. Street flooding major problem in some area, portions of Harbor City were under ponded water 10' deep. Palos Verdes reported 6.08" rain between 6:30 am and 10 pm. Evacuations in Buena Park this evening. Several major roads closed in Orange County. Seven hundred people stranded by bridge washout near Murrietta. Dominguez channel breached in Carson with 4' flooding in places. Mudslides and slumping in South Bay and Palso Verdes Pennisula. Numbers other reports listed.

11:55 pm FFS/LAX ...Flash Flood Watch for Los Angeles, Orange, Western Riverside, and Southwestern San Bernardino Counties Til 3 am...
...Flash Flood Warnings Expired for Topanga, Kinneloa, and Laguna Burn Areas...
...Urban Small Stream Flood Advisory Has Expired for Southern Santa Barbara, Ventura, Los Angeles, Orange, Western and Central Riverside and Southwestern San Bernardino Counties... Ojai 88D indicates heavy showers have moved east of area.

THURSDAY, JANUARY 5, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
12:05 am	WSW/LAX	...Winter Storm Warning for the Southern California Mountains Above 2500 Feet San Bernardino Range Northward Except Santa Barbara County Mountains Through This Morning... ...Winter Storm Warning for Other Mountains Above 4000 Feet Through This Morning... ...Winter Storm Warning for Owens Valley, Through Tonight...
12:05 am	FFA/LAX	...Flash Flood Watch for Los Angeles, Orange, Western

Riverside, and Southwestern San Bernardino Counties Til 3 am. Includes Burn Areas of Malibu/Topanga, Laguna, and Altadena...
...Flash Flood Watch Canceled for Santa Barbara and Ventura Counties...

1:15 am MWS/LAX ...Heavy Surf Continues to Pound Southern California Beaches...

1:30 am FFS/LAX ...Same Headline as 12:05 am...Coverage and intensity of rain gradually decreasing.

3:00 am NPW/LAX ...Wind Advisory for Mountains and Northern Deserts, Including Antelope Valley and Mojave Deserts...

3:00 am WSW/LAX ...Winter Storm Warning for the Southern California Mountains Above 5500 Feet San Bernardino Range Northward Except Santa Barbara County Mountains Through 9 AM This Morning and Above 6500 Feet Southward of the San Bernardino Mountains...
...Winter Storm Warning for Owens Valley, Through 9 AM...

3:00 am FFS/LAX ...Cancel Flash Flood Watch for Los Angeles, Orange, Western Riverside, and Southwestern San Bernardino Counties Which Includes Burn Areas of Malibu/Topanga, Laguna, and Altadena...

5:55 am NPW/LAX ...Wind Advisory for Mountains and Northern Deserts, Including Antelope Valley and Mojave Deserts and Updated to Include Santa Barbara, Ventura and Los Angeles County Coastal Areas...

11:40 am NPW/LAX ...Wind Advisory Remains in Effect for Southern California Mountains, Northern Deserts, and Coastal Sections From Santa Barbara County to Orange County til 6 pm...

12:05 pm MWS/LAX ...Heavy Surf Continues to Pound Southern California Beaches...

1:30 pm NPW/LAX ...Wind Advisory Remains in Effect for Southern California Mountains, Northern Deserts, and Coastal Sections From Santa Barbara County to Orange County til 6 pm...
...Wind Advisory Issued for Southern Deserts til 6 pm...

3:10 pm LSR/SMX ...List of Storm Events from January 4... **Falling tree claims one life.**

5:10 pm MWS/LAX ...Same Headline as 12:05 pm...

5:45 pm NPW/LAX ...Wind Advisory Remains in Effect for Southern California Mountains, Northern Deserts, and Coastal Sections From Santa Barbara County to Orange County Extended til 9 pm...
 ...Wind Advisory Issued for Southern Deserts Extended til 9 pm...

6:22 pm LSR/LAX ...Storm Report of Two Weather Related Deaths from January 4... **Woman killed by 2 cars while crossing flooded street. main died of CO poisoning when sitting in stalled car in flooded street which filled car's exhaust pipe.**

9:00 pm WSW/LAX ...Winter Storm Watch Late Friday Night and Saturday for the Mountains of Southern California...

FRIDAY, JANUARY 6, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
1:45 am	MWS/LAX	...Heavy Surf Will Continue to Pound Southern California Beaches Through Weekend...
8:30 am	WSW/LAX	...Winter Storm Warning for Tehachapi, Santa Barbara And Ventura County Mountains Tonight and Saturday... ...Winter Storm Watch for Other Mountains of Southern California Late Tonight and Saturday... ...Winter Storm Watch for Owens Valley Late Tonight and Saturday...
2:00 pm	MWS/LAX	...Same Headline as 1:45 am...
3:00 pm	WSW/LAX	...Same Headline as 8:30 am... Fast moving storm expected to produce another 6-12" ...
3:00 pm	FFA/LAX	...Flash Flood Watch for Santa Barbara and Ventura Counties Tonight and Early Saturday... ...Flash Flood Watch for Los Angeles, Orange, West Riverside, Southwest San Bernardino Counties Late Tonight through Early Saturday... ...This includes Flash Flood Watch for Possible Mud and Debris Slides for the Malibu/Topanga, Laguna, and Altadena Burn Areas... A storm may result in 1" to 2" rain early Saturday.
5:40 pm	FFS/SMX	...Urban and Small Stream Advisory Tonight and Saturday Morning for San Luis Obispo County Including Highway 41 Burn Area... Storm to hit at 10 pm. Expect from 1 1/2" to 2" coasts to 2" to 2 1/2" HW41 burn area.
9:00 pm	FFS/LAX	...Flash Flood Watch Remain in Effect Til 3 pm

Saturday for Santa Barbara, Ventura, Orange, Los Angeles, Western Riverside, Western San Bernardino Counties Including Malibu, Altadena, and Laguna Burn Areas...

...Urban and Small Stream Advisory Beginning Later Tonight and Lasting Until 3 pm Saturday for Santa Barbara, Ventura, Los Angeles, Orange, Western Riverside, and Western San Bernardino Counties...
Leading edge of next storm 100 miles off coast moving east at 30 mph. Will hit Santa Barbara at about 11 pm, reaching southern LA county by early morning. Rainfall will range from 1/5" to 3" Santa Barbara and 1"-2" other coastal and valley areas.

9:00 pm NWS/LAX ...Same Headline as 1:45 am...

9:00 pm NPW/SMX ...Wind Advisory for Coastal Sections of San Luis Obispo and Santa Barbara Counties Through Tonight...

9:00 pm WSW/LAX ...Winter Storm Warning for the Mountains of Southern California for Late Tonight and Saturday...
 ...Winter Storm Warning Issued Owens Valley Tonight and Saturday...**Snow totals of 8 to 18" predicted by late Saturday.**

10:15 pm FFS/SMX ...Urban and Small Stream Advisory Tonight and Saturday Morning for San Luis Obispo County Including Highway 41 Burn Area... **Spotters report onset of heavy rain with VBG 88D indicating leading edge has arrived.**

10:30 pm NPW/SMX ...Same Headline as 9:00 pm... **Winds gusting to 45 mph.**

10:45 pm MWS/LAX ... Lines of Thunderstorms off Point Conception...

11:40 pm WSW/SMX ...Winter Storm Warning Tonight and Saturday for Mountains of Santa Barbara County...

11:50 pm FFS/LAX ...Same Headline as 9:00 pm... **Precipitation now moving into the area.**

SATURDAY, JANUARY 7, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
12:20 am	MWS/LAX	...Strong Thunderstorms off Coast of Point Conception...
12:35 am	FFS/SMX	...Urban and Small Stream Advisory Tonight and Saturday Morning for San Luis Obispo County Including Highway 41 Burn Area... Rain gauges report 1/2" rain from storm

already.

1:35 am NPW/SMX ...Wind Advisory for San Luis Obispo and Santa Barbara Counties Today...

2:00 am FFS/SMX ...Same Headline as 12:35 am...
...Flash Flood Watch Remains in Effect until 3 pm Saturday for Santa Barbara County... Minor street flooding occurring with some down power lines due to wind. Santa Maria airport has received .58" since midnight.

3:00 am MWS/LAX ...Rain and Some Thunderstorms Moving Down Santa Barbara Channel... Ojai 88D showing large area of rain and imbedded thunderstorms.

3:00 am FFS/LAX ...Flash Flood Watch Remain in Effect 3 pm Saturday for Santa Barbara, Ventura, Orange, Los Angeles, Western Riverside, Western San Bernardino Counties Including Malibu, Altadena, and Laguna Burn Areas...
...Urban and Small Stream Advisory Beginning Later Tonight and Lasting Until 3 pm Saturday for Santa Barbara, Ventura, Los Angeles, Orange, Western Riverside, and Western San Bernardino Counties... Ojai and VBG 88Ds indicating spread of rain southward is now slowing, with general decreasing trend in intensity. However heavy rain has fallen in Santa Barbara county with one gauge receiving 1.53".

3:10 am FFS/SMX ...Cancel Urban Small Stream Flood Advisory for San Luis Obispo County...
...Continue Urban Small Stream Flood Advisory for Santa Barbara County...
...Continue Flash Flood Watch Until 3 pm Today for Santa Barbara County... In SBA county rainfall from storm 1/2 to 3/4", but near 1.5" in few mountain locations.

4:00 am WSW/LAX ...Winter Storm Warning for the Mountains of Southern California for Today...
...Winter Storm Warning Issued Owens Valley Today...

4:00 am FFS/LAX ...Flash Flood Watch Remain in Effect til 3 pm for Santa Barbara, Ventura, Orange, Los Angeles, Western Riverside, Western San Bernardino Counties Including Malibu, Altadena, and Laguna Burn Areas...
...Urban and Small Stream Advisory in Effect Until 7 pm for Southern Santa Barbara, Ventura, Los Angeles...
...Urban and Small Stream Advisory Cancelled for Orange, Western Riverside, and Western San Bernardino Counties... Rainfall estimates through tonight are 1 to 2" most coastal locations, locally 3" in Santa

Barbara as well as all foothill locations.

4:10 am WSW/SMX ...There is a Winter Storm Warning in Effect Today for the Mountains of Santa Barbara County...

4:30 am FFS/SMX ...Cancel Urban Small Stream Flood Advisory for Northern Santa Barbara County...
...Continue Urban Small Stream Flood Advisory for Southern Santa Barbara County...
...Continue Flash Flood Watch Until 3 pm Today for Santa Barbara County...

5:30 am NPW/SMX ...Wind Advisory for the Central Coastal Sections of San Luis Obispo and Santa Barbara Counties This Morning...

5:30 am FFS/LAX ...Flash Flood Watch Remain in Effect til 3 pm for Santa Barbara, Ventura, Orange, Los Angeles, Western Riverside, Western San Bernardino Counties Including Malibu, Altadena, and Laguna Burn Areas...
...Urban and Small Stream Advisory in Effect Until 3 pm for Southern Santa Barbara, Ventura, Los Angeles...
Ojai 88D indicates light to moderate rain over most area, developing southward into Los Angeles Basin. Storm totals are running 1" to 2" Santa Barbara County to 1/2" Ventura County.

6:30 am FFS/SMX ...Cancel Urban Small Stream Flood Advisory for Southern Santa Barbara County...
...Cancel The Flash Flood Watch for Santa Barbara County...

6:40 am NPW/SMX ...Cancel the Wind Advisory for Coastal Santa Barbara County...
...Continue the Wind Advisory Until 8 am for Coastal San Luis Obispo County...

7:00 am FFS/LAX ...Flash Flood Watch Cancelled for Santa Barbara and Ventura County...
...Urban and Small Stream Flood Advisory Cancelled for Santa Barbara County...
...Other Flash Flood and Urban and Small Stream Flood Advisories Remain in Effect... Ojai and VBG indicate rain ending from the west and north.

9:30 am FFS/LAX ...All Flash Flood Watches Cancelled...
...All Urban and Small Stream Flood Advisories Cancelled... Most rainfall totals between 1/2 and 1.25" with one report in Santa Barbara County at 2.05".

9:00 am WSW/LAX ...Winter Storm Warning for Mountains of Southern California Today Remains in Effect...

...Winter Storm Warning for Owens Valley Cancelled...

1:15 pm WSW/LAX ...Winter Storm Warning Cancelled for Mountains of Southern California...
...Winter Weather Advisory in Effect for Mountains of Southern California Tonight...

2:50 pm FFS/LAX ...Urban and Small Stream Flood Advisory in Effect Until 9:00 pm for Southern Los Angeles and Orange Counties... Front has stalled in the area with rainfall in excess of 13/4" noted in coastal locations and 3" foothills. Another 1" may yet fall.

5:35 pm MWS/LAX ...Moderate Surf Expected Along Southern California Coast...

5:35 pm FFW/LAX ...Flash Flood Warning with Possible Mud and Debris Flow for the Kinneloa Burn Area Until 9 pm Tonight... Runoff and mudflow reported to be a "problem" in the area. Rainfall of .75" to 1" storm total have fallen, but 2.5" of rain fell in the mountains north of the burn area.

8:45 pm WSW/LAX ...Winter Weather Advisory in Effect for Mountains of Southern California Cancelled...

8:50 pm FFS/LAX ...Flash Flood Warning for Kinneloa Burn Area Cancelled...
...Urban and Small Stream Flood Advisory for Southern Los Angeles and Orange County Cancelled... Rain has let up.

8:55 pm NPW/LAX ...Dense Fog Advisory for Mountain Areas of Southern California Through 11 am Sunday Morning...

SUNDAY, JANUARY 8, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
4:10 am	NWS/LAX	...Moderate Surf Along Southern California Coast Increasing Today Through Monday...
4:30 am	NPW/LAX	...Dense Fog Advisory for Mountain Areas of Southern California Through 11 am This Morning...
6:00 am	SPS/LAX	No Headline. Much stronger storm with more significant rain will move into Southland Monday Night and Tuesday. Rainfall expected to be 1 to 2 " coast and 3" mountains.
11:45 am	SPS/LAX	...Doppler Radar Shows Rain Still Developing and Moving

Across the Coast of Southern California... Rain intensifying but most significant storm still expected Monday Night and Tuesday.

2:32 pm MWS/LAX ...Same Headline as 4:10 am...
6:30 pm SPS/LAX ...Light to Moderate Showers on the Doppler Radar...
10:55 pm SPS/LAX ...Same Headline as 6:30 pm...

MONDAY, JANUARY 9, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
4:05 am	SPS/LAX	...Light Rain Continues to Fall over the Southland This Morning...
8:40 am	MWS/LAX	...Moderate Surf Along Southern California Coast Continues...
9:30 am	WSW/LAX	...Winter Storm Watch Mountains of Southern California Above 7000 Feet in Effect for Tonight and Tuesday...
9:55 am	FFA/LAX	...Flash Flood Watches Cover Coastal and Mountain Sections Today Through Tuesday Afternoon. This Includes Flash Flood Watch for Possible Mud and Debris Flows for the Malibu/Topanga, Laguna, and Altadena Burn Areas... ...Urban and Small Stream Flood Advisory for All Coastal and Mountain Sections Today Through Tuesday... Persistent rains have caused many small creeks to rise. Preliminary estimates are widespread rains of 2" with mountains receiving 3" - 4" by storms end Tuesday afternoon.
10:30 am	FFS/SMX	...Urban and Small Stream Flood Advisory in Effect Until Tuesday Afternoon for Santa Barbara County... ...Flash Flood Watch in Effect Til Tuesday Morning for Santa Barbara County... Much of area has received between 2 and 5" of rain last 24 hours. Between 4 and 6" has fallen in the last week. Additional heavy rains will cause problems.
12:45 pm	FFS/LAX	...Flash Flood Watches Cover Southland Coastal, Valley, and Mountain Sections Today Through Tuesday Afternoon... ...These Watches Include the 3 Burn Areas for Tonight and Tuesday... ...There are Urban and Small Stream Flood Advisories for All Coastal, Valley, and Mountain Sections Today Through Tuesday... An observer in Malibu reports 11.9" of rain since Friday at 5 pm. Ground is saturated.

Rains forecast to increase tonight, from west to east. Rains will start in Santa Barbara/Ventura by midnight and hit IV metro by morning. Estimates call for 2" coastal locations with 3" to 4" mountains.

4:00 pm WSW/LAX ...Same Headline as 9:30 am...

4:40 pm FFS/LAX ...Same Headline as 12:45 pm... Heavy rain expected Santa Barbara and Ventura Counties by midnight. Amounts expected 2" coastal locations with 4" mountains.

6:00 pm MWS/LAX ...Same Headline as 8:40 am...

6:15 pm FFS/SMX ...Cancel Mudslide/Debris Flow Warning for HWY41 Burn Area in San Luis Obispo County...
...Urban and Small Stream Flood Advisory in Effect Until Tuesday Afternoon for San Luis Obispo and Santa Barbara Counties...
...Flash Flood Watch in Effect Until Tuesday Morning for Santa Barbara County... Automated gauges in srn Santa Barbara County have recorded 2"-5" rain last 24 hours. Rainfall totals near HWY41 have been less than 1". Another 1.5" coast and 2" mountains expected tonight.

9:30 pm FFS/LAX ...Same Headline as 12:45 pm...Ojai 88D shows rain approaching. Expect 2" coastal locations and 3" - 4" mountains through Tuesday.

9:30 pm NPW/LAX ...High Wind Warning in Effect for Mountains of Southern California Through Tuesday...

10:00 pm WSW/LAX ...Same Wind Headline as 9:30 pm...
...Winter Storm Watch Mountains Southern California Above 7000 Feet Tuesday...Expect 1' snow higher elevations.

11:00 pm FFS/SMX ...Urban and Small Stream Flood Advisory in Effect Until Tuesday Afternoon for San Luis Obispo and Santa Barbara Countys...
...Flash Flood Watch in Effect Til Tuesday Morning for Santa Barbara County...Heavy rain has begun with initial reports of .5" in last hour.

11:30 pm FFW/LAX ...Flash Flood Warning for West Ventura County Along the Ventura River Until 6 am...Ojai 88D indicates heavy rain moving into area with couple inches of rain expected next six hours. Ventura River has risen and is at a stage where alerts are to be issued.

TUESDAY, JANUARY 10, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
12:35 am	FFS/LAX	...Flash Flood Warning in Effect for West Ventura County Until 6 am... ...Flash Flood Watch in Effect Coasts, Valleys, and Mountains of Southern California Through Tuesday...Ojai 88D indicates 2" more rain over Ventura watershed by 4 am.
12:45 am	FFW/LAX	...Flash Flood Warning for Santa Barbara County Until 6 am...Ojai 88D indicates 2" rain will fall into area by 4 am. Ground is already saturated.
1:00 am	WSW/LAX	...High Wind Warning for Mountains of Southern California Through Tuesday... ...Wind Advisory Issued for Coastal Areas of Northern Santa Barbara County Through Tuesday Morning...
1:35 am	FFS/LAX	...Same Headline as 12:45 am... ...Same Headline as 12:35 am...Ojai 88D shows large area of rain, some heavy, moving from Santa Barbara County eastward. Santa Maria has received 1" rain last several hours.
2:30 am	FFS/SMX	...Urban and Small Stream Flood Advisory in Effect Until Tuesday Afternoon for San Luis Obispo and Santa Barbara Countys... ...Flash Flood Warning in Effect Til 6 am for Santa Barbara County...Many streams and creekbeds already bankfull with VBG 88D indicating heavy rain will continue until 4 or 5 am with rainfall rates of .5" per hour.
3:00 am	FFW/LAX	...Flash Flood Warning with Possible Mud and Debris Flows for the Malibu/Topanga Burn Area Until 10 am This Tuesday Morning...Ojai 88D shows heavier rain expected Malibu area by 4 am and will continue for several hours. Rainfall amounts of 2" expected.
3:35 am	FFW/LAX	...Same Headlines as 1:35 am... ...Urban and Small Stream Flood Advisories for the Coasts and Valleys Through This Afternoon...Ojai 88D shows large area moderate to heavy rain over Santa Barbara and Ventura Counties extending westward. Since midnight in these two counties from .5" to 2" has fallen, with 4.17" at Alisal Reservoir. Widespread rainfall can be expected over the Southland with 1.5" to 3" expected over the coasts and 5" in the mountains through tonight.
3:30 am	WSW/LAX	...Winter Storm Warning Southern California Mountains

Above 6500 Feet Through Tuesday Night... Snowfall amounts of 12 to 18" expected.

4:00 am MWS/LAX ...Moderate Surf Continues Along Southern California Coast...

4:15 am FFW/LAX ...Flash Flood Warning for ALL of Ventura County Until 10 am...Ventura River over flood stage and Santa Paula Creek is approaching flood stage. Rainfall amounts of 3" to 5" expected over Ventura Mountains.

4:52 am FFS/LAX ...Same Headline as 3:00 am...
...Same Headline as 12:45 am...
...Same Headline as 4:15 am...
...Flash Flood Watch Remains For Coasts, Valleys, and Mountains of Southern California Through This Afternoon...Ojai 88D shows large area of rain over Santa Barbara and Ventura Counties. Over 4" has fallen in areas since midnight with 2.55" in Santa Barbara. A number of creeks are overflowing with some evacuations. Ventura Sheriff reports numerous flood problems and mudslides. Ojai has 4" water over its roads.

5:11 am WSW/LAX ...Same as 3:30 am Headline...

5:30 am FFW/LAX ...Extend Flash Flood Warning for Santa Barbara County til 10 am PST...Heaviest rain is over Santa Ynez Mountains where 1" has fallen last hour. Refugio and Alisal reservoirs have received 5" rain since midnight.

5:45 am FFS/SMX ...Small Stream Flood Warning for San Luis Obispo County til Mid Morning...Up to 5" rain has fallen last 24 hours creating flood problems and road closures. Several homes and a restaurant at HW41 have been damaged. Tassajara Canyon road is under 4' of water.

6:00 am FFW/LAX ...Flash Flood Warning Issued for All of Los Angeles County Except the Desert Portion Until Noon. This Includes Burn Areas of Malibu/Topanga and Altadena...Ojai 88D indicates heavy rain over Santa Barbara and Ventura County will move into Los Angeles County with 5" expected in the mountains and 3" in the basin by evening. Malibu has received .47" last 1/2 hour.

7:17 am FFS/LAX ...Same Headline as 4:15 am...
...Same Headline as 5:30 am...
...Same Headline as 6:00 am...
...Flash Flood Watch and Urban and Small Stream Flood Advisories Remain in Effect for Remainder of Coasts, Valleys, Mountains of Southern California Through this

Afternoon...Up to 6" rain has fallen in mountains of Ventura and Santa Barbara Counties since midnight with 3" in the valleys. Heavy rain now moving into Los Angeles County. Rivers and streams in the Ventura and Santa Barbara Counties are flooding.

7:55 am FFS/SMX ...Same Headline as 5:45 am...Heavy rains have let up but serious flood problems remain. High winds to 93 mph noted at Black Mountain. Avila Valley cut off by washed out bridge. Camp ground at Avial Beach evacuated.

8:34 am FFW/LAX ...Flash Flood Warning Extended for Santa Barbara, Ventura, and Los Angeles Counties Until 6 pm Tonight...
...Flash Flood Warning for Malibu/Topanga and Altadena Burn Areas Extended Til 6 pm...
...Flash Flood Warning for Orange County, Including Laguna Burn Area Until 6 pm Tonight...
...Flash Flood Warning for Western San Bernardino and Western Riverside Counties Until 6 pm Tonight...
...Flash Flood Watch Remains in Effect for Remainder of Coasts, Valleys, Mountains of Southern California Until 6 pm...
...Urban and Small Stream Flood Advisory for Owens Valley Until 6 pm...Ojai 88D shows heavy rain over area from Orange County northward. Heavy rain has been falling in Los Angeles area since 6 am. Portion of I405 over Sepulveda Basin closed from a mudslide. Brief respite in rain expected Santa Barbara County for several hours before heavy rains return.

9:10 am WSW/LAX ...Same Headline as 3:30 am...

11:50 am SPS/LAX ...Specific Rain Amounts Southern California Since Midnight...Santa Barbara County 4" to 6.65". Ventura County 2" to 6.7". Los Angeles County 1.4" to 4.7". Orange County .47" to .67".

12:05 pm WSW/LAX ...Same Headline as 12:05 pm...

12:30 pm FFS/SMX ...Small Stream Flood Advisory for San Luis Obispo County Until 8 pm...Another band of showers expected this afternoon.

1:05 pm FFW/LAX ...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, Western Riverside, and Western San Bernardino Counties Extended Until Midnight...
...Flash Flood Warning for Malibu/Topanga and Altadena Burn Areas Extended Til Midnight...
...Flash Flood Warning for Northern Santa Barbara County (North of Santa Ynez Range) Downgraded to a

Flash Flood Watch Until Midnight...

...Flash Flood Watch Remains in Effect for Remainder of Coasts, Valleys, North of Laguna Beach, and Mountains of Southern California Until Midnight...

...Urban and Small Stream Flood Advisory for Owens Valley Extended Until Midnight...Ojai 88D shows band of very heavy rain moving into Eastern Ventura and Western Los Angeles Counties. Satellite indicates this band extends west 300 miles SW of Malibu. Heaviest rain will fall Ventura and Los Angeles Counties next several hours.

2:00 pm	MWS/LAX	...Same Headline as 4:00 am...
3:20 pm	WSW/LAX	...Same Headline as 3:20 am...
3:15 pm	SPS/LAX	...Specific Rain Amounts Southern California 2 pm Mon to 2 pm Tue...Santa Barbara County 8" to 10.08". Ventura County 3.5" to 12.32". Los Angeles County 2.6" to 6". Orange County 1.57" to 1.87".
3:40 pm	FFW/LAX	...Same Headline as 1:05 pm...Update of heavy rain areas detected by Ojai 88D.
4:50 pm	SPS/LAX	...Specific Rain Amounts Southern California 4 pm Mon to 4 pm Tue...Santa Barbara A/P 7.44", Junkel Dam (in Santa Ynez Range) 10", Ventura City 4.55", Ojai 3.86", L.A. Civic Center 2.99", Pasadena 5.30", Santa Ana 2.31"
5:15 pm	FFS/LAX	...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, Western Riverside, and Western San Bernardino Counties Until Midnight... ...Flash Flood Warning for Old Topanga, Kinneloa, and Laguna Burn Areas Til Midnight... ...Flash Flood Watch for Northern Santa Barbara County Until Midnight... ...Urban and Small Stream Flood Advisory for Owens Valley Until Midnight...Band of heavy precipitation near LA/San Bernardino County Line moving east. Numerous freeways, arteries, and streets remain closed due to flooding.
5:45 pm	WSW/LAX	...Same Headline as 3:30 am...
7:25 pm	FFW/LAX	...Same Headline as 5:15 pm...
8:00 pm	FFW/SMX	...Cancel Small Stream Flood Advisory for San Luis Obispo County...
9:00 pm	WSW/LAX	...Cancel Winter Storm Warning for Southern California

Mountains...

9:00 pm SPS/LAX ...Specific Rain Amounts Southern California 8 pm Mon to 8 pm Tue...Santa Barbara (Mission Creek) 8.19", San Marcos Pass (Santa Barbara County) 10.12", North Fork Matilija Creek (Ventura County) 12.64", White Ledge Peak (Ventura County) 9.29", L.A. Civic Center 3.23", Mailbu 4.09", Easton Canyon near Altadena 5.39", Riverside 2.00"

9:25 pm FFS/LAX ...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, West and Central Riverside, and Southwestern San Bernardino Counties Until Midnight. This includes Mountains But Not Open Deserts...
...Flash Flood Warning for Old Topanga, Kinneloa, and Laguna Burn Areas Til Midnight...
...Flash Flood Watch for San Diego County Until Midnight...
...Urban and Small Stream Flood Advisory for Owens Valley and San Diego County Until Midnight...**Heavy precipitation not widespread at present, but several rivers remain at flood stage and numerous streets and freeways remain closed due to flooding. Rain showers will continue in many locations tonight.**

9:25 pm FFS/LAX ...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, West and Central Riverside, and Southwestern San Bernardino Counties Extended Until 6 am Wednesday. This includes Mountains But Not Open Deserts...
...Flash Flood Warning for Old Topanga, Kinneloa, and Laguna Burn Areas Extended Until 6 am Wednesday...
...Flash Flood Watch for San Diego County and Northern Santa Barbara Counties Until 6 am Wednesday...
...Urban and Small Stream Flood Advisory for Owens Valley and San Diego County Until Midnight...**Ojai and VBG 88Ds and satellite imagery show more rain spreading into area from Pacific. Flooding still a major problem in area.**

11:45 am FFW/LAX ...Same Headline as 9:25 pm...Issued to place under correct AFOS PIL (FFW)

WEDNESDAY, JANUARY 11, 1995

Time (PST)	Product Office	Headline/Brief Summary of Important Content
1:20 am	FFS/LAX	...Same Headline as 9:25 pm Tuesday... 88Ds and satellite indicate another 1" to 2" of rain can be expected today.

2:30 am MWS/LAX ...Moderate Surf Continues Along Southern California Coast...

3:20 am FFS/LAX ...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, West and Central Riverside, and Southwestern San Bernardino Counties Until 6 am Wednesday. This includes Mountains But Not Open Deserts...
...Flash Flood Warning for Old Topanga, Kinneloa, and Laguna Burn Areas Until 6 am Wednesday...
...Flash Flood Watch Cancelled for San Diego County, but Continued Northern Santa Barbara Counties Until 6 am Wednesday...
...Urban and Small Stream Flood Advisory for Owens Valley and San Diego County Cancelled...

6:00 am FFW/LAX ...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, West and Central Riverside, and Southwestern San Bernardino Counties Extended Until Noon. ...Flash Flood Warning for Old Topanga, Kinneloa, and Laguna Burn Areas Extended Until Noon...
...Flash Flood Watch for Northern Santa Barbara Counties Extended Until Noon...**light to moderate showers over area. Large area moderate rain off the coast moving inland. Expect 1" rain coasts and 2" additional rain mountains on top of extremely saturated soils.**

7:20 pm SPS/LAX ...Specific Rain Amounts Southern California 6 pm Tue to 6 pm Wed...**Santa Barbara County near 1.5". Ventura County 1.5" to 3.6". Los Angeles County 2." to 3.15". Orange County 1.37" to 3.6". San Bernardino 1.5" to 2.53".**

9:30 pm FFS/LAX ...Flash Flood Warning for Southern Santa Barbara, Ventura, Los Angeles, Orange, Southeastern Kern, West and Central Riverside, and Southwestern San Bernardino Counties Extended Until Noon. ...Flash Flood Warning for Old Topanga, Kinneloa, and Laguna Burn Areas Extended Until Noon...
... Flash Flood Watch Takes Effect for All Above Mentioned Areas from Noon to 8 pm Tonight...
...Flash Flood Watch for Northern Santa Barbara Counties Extended Until 8 pm Tonight...**Flooding is subsiding, but more rain expected later tonight through this evening.**

11:45 pm FFS/LAX ...All Flash Flood Warnings Downgraded to Watches as per Above Statement... **Additional rainfall still expected over area this afternoon and evening.**

3:15 pm FFS/LAX ...Flash Flood Watch Continues for Santa Barbara, Ventura, Los Angeles, and Orange Counties Until 8 pm Tonight...
...Flash Flood Watch Continues for the Mountains and Coastal Valleys of Southeast Kern, West and Central Riverside, and Southeast San Bernardino Counties Til 8 pm Tonight...

4:35 pm SPS/LAX ...Radar Showed More Rain Moving Onshore from the Pacific Ocean and a Flash Flood Watch is in Effect Til 8 pm...Ojai 88D shows large area of rain from Pt. Conception west and southwest. Rainfall of 1/2" to 1" expected this evening.

4:55 pm SPS/LAX ...Deluge of Rain Over the Southland for Past Eight Days...

	Since Jan 3	Since Jan 7
Santa Maria	6.77"	3.42"
Santa Barbara	15.9"	10.9"
Mailibu	12.24"	6.73"
LA Civic Centr	6.81"	5.12"
Laguna	8.74"	4.53"
Riverside	6.07"	2.60"

5:10 pm MWS/LAX ...Same Headline as 2:20 am...

6:20 pm FFS/LAX ...Same Headline as 3:15 pm...Ojai 88D indicates fast moving rain showers to spread across area from about 7 to 11 pm.

7:35 pm FFS/LAX ...Extend Flash Flood Watch Until Midnight for Malibu/Old Topanga, Altadena/Kenneloa and Laguna Burn Areas...
...Cancel Flash Flood Watch Elsewhere Over Southern California...

8:05 pm SPS/LAX ...Deluge of Rain Over the Southland for Past Eight Days...

	Since Jan 3	Since Jan 7
Santa Maria	6.84"	3.49"
Santa Barbara	16.69"	11.69"
Gibraltar Dam	22.16"	15.35"
Ventura	11.43"	7.13"
Mailibu	12.59"	7.08"
LA Civic Centr	7.06"	5.37"
Laguna	8.74"	4.53"
San Diego	3.88"	1.28"

9:45 pm FFS/LAX .. Flash Flood Watch Until Midnight for Malibu/Old Topanga, Altadena/Kenneloa and Laguna Burn Areas...

11:45 pm FFS/LAX ...Cancel Flash Flood Watch for Malibu/Old Topanga,

Altadena/Kenneloa and Laguna Burn Areas...